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IN REGARD TO THE PROPOSED AMERICAN GAS INSTITUTE.

Perhaps the most interesting paper read at the May meeting of the Western Gas Association was that contributed by Mr. Frederic Egner, Engineer and Superintendent of the Laclede Gas Company, of St. Louis, Mo. That gentleman hardly requires a formal introduction to our readers, for they have often read in our columns articles from his ready pen, and which articles, we venture to say, have been perused with pleasure and studied with profit by the members of the fraternity. Mr. Egner's communications, aside from any consideration of their technical application, certainly carry the impression that their writer has no twofold purpose to serve; in other words, that he honestly means that which his language expresses. Now, with such an understanding of the author's straightforwardness, we take it for granted that his paper on a proposed American Gas Institute (it will be found in our issue for June 2, pp. 344–5–6) has been carefully read and digested by the fraternity, and that they are now ready to make intelligent and positive response to the questions contained in the circulars which the Committee, appointed by the Western Association anent the subject, are now mailing to every gas company in the country.

The circular letter proposes five questions, and of these we reproduce the following:

II. Does the proposed scheme look feasible to you?

III. If not as a whole, which would you favor most—the union for mutual defense, or the establishment of a bureau of investigation for the spreading of useful knowledge, as proposed in the paper mentioned?

IV. Will your Company contribute towards the support of such an institution; and, if you can, please state for how long, and how much to begin with?

It goes without saying that these queries should not be very difficult to answer, for the discussion at St. Louis showed quite clearly that nearly all those present entertained decided opinions on the subject. In respect to question No. II., we believe that, as a whole, a divided answer may or must be given; therefore we can at once take up No. III. The idea of a union for mutual defense is by no means a new one, for that scheme has been broached at divers periods in the gas history of the country. In fact, at one time it seemed as if the plan were about to be accomplished, but the surface signs were fallacious, for when the negotiations seemingly approached the point where a tangible organization was to be made, differences of opinion regarding the levying and collection of the assessments, caused a decidedly sudden abandonment of the scheme. Perhaps the future may witness a more cohesive frame of mind on the part of the fraternity in regard to the system of a "defensive League," but the working members of the profession, being pretty well posted now about the jealous way that capital resents any interference with its disposition and government, are not likely to lend their aid any longer in the furtherance of a project that, after all, is not a prime personal factor in the conduct of their respective trusts. Coming to the second clause of the third question, "the establishment of a bureau of investigation for the spreading of useful knowledge," there can be but one answer thereto. Could such an institution be established—and we not only think it can, but that it eventually will be formed—the resultant

benefits from its working would seem to be absolutely immeasureable. Take, for instance, the deliberate opinion put forth by Mr. F. C. Sherman, of New Haven, Conn., during the discussion on this end of the Egner proposition. Mr. Sherman is not, as a general thing, given to the practice of speaking positively on mooted points—for he is rather conservative in his opinions—but here we find him willing to commit himself most decidedly on what we must look as a new departure. Quoting Mr. Sherman's judgment in the premises, we find that he said: "If we could apply to such an Institute for information in regard to any old or new process or invention brought before us, it would save our companies thousands of dollars each year." Other speakers preceded and followed him with remarks of a similar import. Now we think we are not far wrong in believing that as these gentlemen spoke so also will the majority of those to whom the committee circulars are addressed reply. The annual money assessment required to carry on the work of the Institute will be very small—in fact, infinitesimal when the value received therefor is estimated. Speaking for ourselves, we heartily favor the Egner project, and firmly believe that it is certain to become an accomplished fact. In conclusion we would ask that all those who receive a copy of the circular shall lose no time in making a reply thereto, even should some feel obliged to dissent to its propositions.

A SAMPLE OF THE GAS MADE BY THE "BABY" PROCESS.

We have hitherto given some account of the arguments put forth in favor of their plaint by the parties who are anxious to obtain a franchise for the right to construct and operate a gas works in opposition to the old Springfield (Mass.) Gas Light Company, and the truth is told when we say that the preliminary hearings did not disclose anything that differed materially from the usual stock arguments, so often heard on like occasions before scores of Council Boards in as many different sections of the country. The latest proceedings before the Springfield Board, however, have reversed this monotony, for these have introduced to us a somewhat remarkable pair of analyses, an examination of which will reveal to the student that some illuminating gases are fearfully and wonderfully made.

The local public interest that attaches to the present gas controversy at Springfield was amply shown by the large attendance of visitors during the sittings of the City Council during the evenings of July 6 and 7—both sessions lasted until midnight—and perhaps the residents of that charming city are now aware that the business of gas manufacture is a somewhat complicated affair. But aside from the value of the hearing, in respect of its tendency to act as an educator of the public in ways that are gaseous, we submit that some of the evidence adduced ought to go far towards causing many a gas engineer to think that a gas containing 29.39 per cent. of ingredients, which at best (or worst) are worthless as parts of a compound supposed to be manufactured for the ultimate purpose of producing light, is well entitled to the claim of being made under a "baby process." During the hearing Mr. W. A. Allen, Superintendent to the Company now supplying gas to Albany, N. Y., gave strong and positive testimony in regard to the merits of the "baby process" gas—that gas is used in Albany—but his testimony was confined to general statements. Indeed, Mr. Allen did not seem to know much about the Albany Company's capital, was equally at sea in point of figures concerning the economy of the process, and failed to remember distinctly the names of the constituents of the gas as shown by analytical tests. Mr. Long, of counsel for the Springfield Company (and he is ever ready to assist a brother engineer in distress) kindly came to Mr. Allen's aid, and supplied him (and the Council) with the results of two tests of Albany "baby process" gas. The determinations were made by Prof. C. W. Hinman, Gas Inspector for the State of Massachusetts, the examined product having been taken from different Albany levels. The figures are as follows:

Constituents.	First Test.	Second Test.
Illuminants	20.22	20.56
Marsh gas	25.21	25.56
Hydrogen	24.24	24.78
Carbonic oxide	1.56	.71
Nitrogen	19.43	18.98
Oxygen	4.46	4.32
Carbonic acid	4.88	5.09

From an inspection of the above is it to be wondered at that Mr. Allen was all at sea in respect to the constituents of the Albany product? Even the layman who looked over Prof. Hinman's figures might be excused for asserting that that "baby" had been prematurely born, and that said minor would need considerable reconstruction to enable it to escape from that condition of innocuous desuetude into which many other gaseous visions (so full of promise in their early youth) have faded.

[Official Report.—Continued from page 8.]

Tenth Annual Meeting of the Western Gas Association.

Held at St. Louis, Mo., May 11, 12 and 13, 1887.

Second Day—Morning Session.

Discussion on Mr. B. E. Chollar's Paper on the Rule of the Inverse Squares.*

Mr. McIlhenny—I would like to ask whether Mr. Chollar claims that the old and accepted rule of measuring light is incorrect. Instead of the rule of the square of the distances it seems to me that he has established another rule, or that of the square of the diameters of the spheres.

Mr. Chollar—I do not quite get your idea.

Mr. McIlhenny—I understood you to say that the square of the diameters of the spheres, instead of the square of the distances, is the proper rule of measurement.

Mr. Chollar—It is the square of the distances of the light from any given point. If there is a light at *A* and another light at *B*, there must

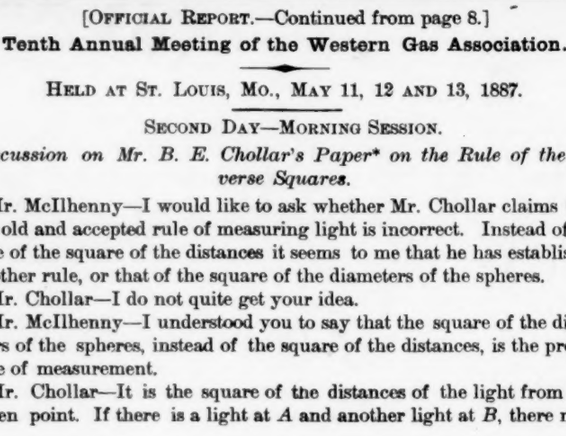


Diagram I.

be a point where the light is equal, and the intensities of those lights will be equal to the diameters of the squares.

Mr. McIlhenny—So that your theory really does not alter the old calculation?

Mr. Chollar—No. Although a sphere can have more than one point, yet if you consider the light to increase in magnitude then it is no longer

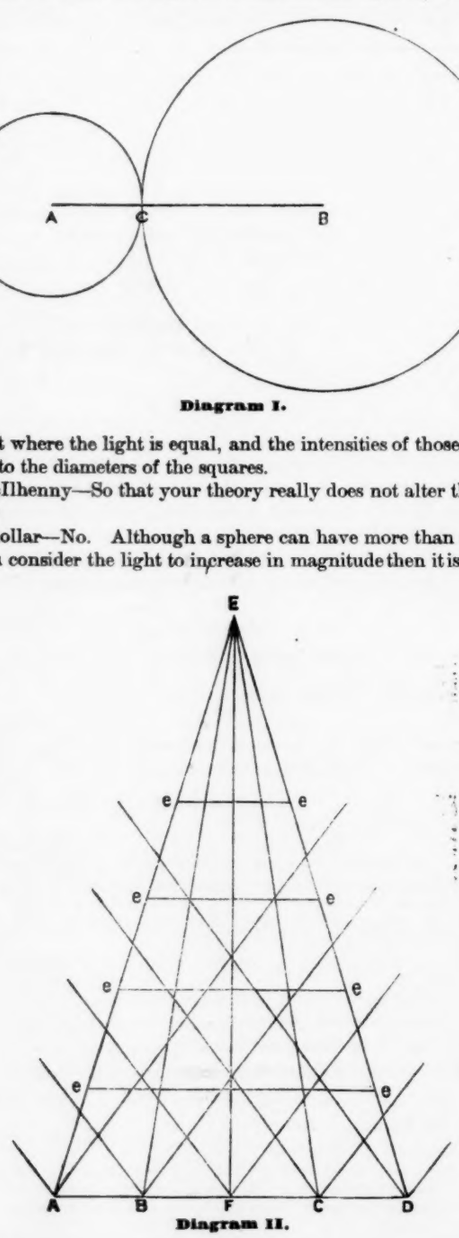


Diagram II.

a point. While there are rays that radiate from every possible point of that line, *E F*, there is one ray from each point which will pass through any point, for instance, through *E*, and consequently there will be a series of convergent rays passing, through any point in the diameter,

* For paper, see ante, p. 7.

from *E* to *F*. Now, the sections of these triangles being proportioned to the distance, and since every ray that passes in the direction of this point must keep within this triangle, it follows that the aggregate number of wave vibrations must be the same here [referring to diagram], because since they can neither get in nor out, they must necessarily stand in that triangle, and the total number of wave vibrations being so concentrated, the quantity of light is consequently independent of the distance.

Mr. McIlhenny—Therefore you reason that the intense arc light does not pass its rays as far as those from gas light.

Mr. Chollar—They diminish more rapidly. One follows the rule of inverse squares, while the other does not. The arc light approximates a point where nearly all the rays are diverted. It has no convergent rays—because the size of the light is so small—consequently that practically follows the law of inverse squares, and decreases very rapidly. But in a light like the Siemens-Lungren, or one with a large area, and having divergent rays at each point, although the intensity increases in proportion to the squares, yet the aggregate of light holds its own, and is independent of the distance.

Mr. McIlhenny—I rose to thank Mr. Chollar for his paper; and while I do say that those papers hitherto read by him have been of interest, I think his present contribution, and particularly the concluding remarks, must have been pleasing to us all. The gentlemen here who represent the gas interests should read it carefully and apply it to their business. I think that gas suffers a great deal, and in many ways, from the imperfect methods of consuming it. Mr. Chollar said, the full value of gas light is not received by those who pay for it. For instance, look at the gas fixtures in this room! Can anything be worse? The fixtures are at fault. All those solid balls—I suppose they are intended for ornamentation—beneath the globe are mistakenly placed. Then, the ground glass globes are also out of place—that they are not clean is another mistake. The heavy globe holders are in error. The less there is about a chandelier, by way of fixture and color of globe, the better will be the light. Enough attention is not paid to the location of the light itself. These are exceedingly valuable considerations, and deserve the attention of all engaged in the gas business. I have known instances where people who were paying for a large gas blaze, in a chandelier hung 8 or 10 feet from the floor, and were not getting as satisfactory results from that light as they would secure from a single bracket light. They would perhaps be better satisfied with 1 burner on a bracket than with 3 or 4 lights from a chandelier, hung in the center of the room, and surrounded by improper fixtures. Therefore, all such suggestions are exceedingly valuable. The more that such information is disseminated by the gas fraternity the more you will popularize the use of gas. Such practical suggestions will tend to reduce gas bills, and I have never yet seen a gas man who did not regret the fact when he knew that the bills rendered for gas were too large. I always regret seeing a man's bill larger than I think it ought to be; and when it is small it always gives me pleasure. Such suggestions popularize the use of gas, and the profits come back to us in the long run. I think that one of the most serious evils we suffer from today is this thing of defective service. If greater attention were given to locating the lights where they ought to be placed, gas bills, as a rule, would be reduced, and the people would be better satisfied. We should not expect our consumers to be satisfied with half-way service. They ought to have the best, and when they have the best they will be willing to pay for it. I think that this paper will draw attention to a subject which has needed more extensive attention than has been accorded it in the past.

Mr. Chollar—It would be a very great advantage if we could add 40 or 50 per cent. to our yield, but do we not practically accomplish the same result if we can develop 40 or 50 per cent. more light from our present yield? If we can do that, and without additional cost, gas would certainly prove to be the conqueror in its contest with the electric light. No one can deny that one Lungren burner will, in practice, easily displace 2½ incandescent (16-candle power) lamps; and this would make it appear that there is something wrong with the photometer in its capacity as a measure of light

Mr. McIlhenny—You often have noticed how brilliant the incandescent light seems to be when shining through the small globe that incloses it. The electrical promoters see to it that the glass is clear, so that no obstruction is offered to the transmission of the rays of light through the glass. I think it important that the attention of members should be called to these very practical suggestions with regard to the light that might be (but which is not) obtained from gas; in other words, to the fact that we may increase by 40 or 50 per cent. the light developed, which will be substantially equivalent to an increase of 40 or 50 per cent. in the yield.

Mr. Chollar—I would like to call attention to the fact, as it appears to me, that our estimate of the actual size of incandescent and arc lights is quite deceptive, being largely dependent on the irradiation effect on the observer. If, for instance, we look at the new moon we seem to find that the bright part of it looks larger than the dark part. That, so far as I have been able to discover, is due to a sort of defect in the eye—the intense light blurs a little on the retina. It might be illustrated by means of penmarks on paper. On smooth calendered paper the pen makes a fine or clean-cut ink mark; but if drawn on blotting paper the mark spreads somewhat. So the impression of light on the eye spreads a little, and a very bright light looks really larger than it actually is. I think there is a good deal of truth in the idea that in this respect the incandescent light swells up (like a cat's tail) and looks much larger than it really is. The filament in the incandescent light is quite small, but when it becomes illuminated it looks ten times as large as it actually is. It is an illusory light.

Mr. King—In former discussions on this subject the question whether an equal size of flame gave an equal volume of light, or whether water gas, under the photometer, would give a candle power equal to coal gas, or whether it would diffuse as far, or further, than coal gas was considered. I believe that as high authority as could be obtained on the question decided that it would not.

Mr. Chollar—If the product of the intensity and size is the same, a large light can be equal to a small light; but the factors will be different, or exactly as with the electric current. With certain power it can be of high potential and small current, or of low potential and large current. It is just like the blow of a hammer. A heavy blow of a small hammer will correspond to the light blow of a heavy hammer. They will not be identical, but the effects will be the same. Although the small water gas light will not be identical with the larger but less intense coal gas light, the energy of the total light given would be the more satisfactory because of its uniformity.

Mr. Boardman—I think the point that Mr. Chollar makes with regard to the areas of light may be illustrated in this way. [Here the speaker referred to Diagram I.] Let *B* represent an arc light of high intensity and small local point, while *A* represents the center of a gas flame. Then the small intensity will be represented by the area with *AC* as a radius. That is now the only point of that gas flame which is being measured against the local point of the arc light. If you give that flame any magnitude, each point of that flame illuminates an area equal to the surface of the circle *AC*, so that from each point of it you may draw a circle, which may be illustrated in this way. [See Diagram III.] Now,

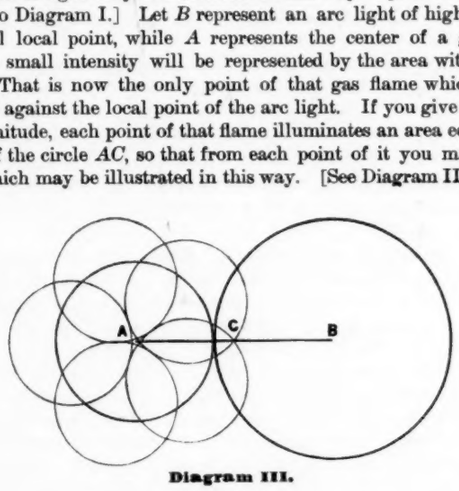


Diagram III.

the total illuminating power of that gas lamp is not represented by one of those circles, but by the sum of all of them—not taken individually, but by the entire surface inside of this circle. The divisibility of that light is represented by the large circle, including all these smaller circles. That is the illuminating power, and that intensity is to be multiplied by the area—which is the point I tried to make clear in my paper read last year before the American Association. Simply stated—that a great part of the value of a light depended upon its size, which latter feature determines its availability for illuminating space. The point that Mr. King made with regard to the water gas (having high intensity and equal areas with the coal gas flame) not diffusing its light so well, is not because the sizes of the flames are different, but, as I take it, may be traced to the difference in color. Suppose you take a water gas flame, with its higher heat, and, therefore, whiter light, and compare it with the flame from coal gas, with is lower temperature and greater proportion of yellow rays—each light to have the same area—the total product of the area into the intensity would be in favor of the whiter gas; but the diffusibility would not necessarily be the same, I think, on account of the difference in color. I think that this is a factor which should also be taken into consideration. We know that the yellow rays have greater diffusibility, and take up more room in the spectrum, than the lighter and whiter rays.

Mr. King—That is the point that I attempted to get at. I agree with Mr. Boardman in his statement of the case.

Mr. McMillin—Mr. Humphreys, Secretary of the American Association, is present, and if he heard Mr. Chollar's paper read we would be glad to to have him add something to the discussion.

Mr. Humphreys—I heard so little of the paper that I hardly feel like discussing it.

On motion of Mr. Jenkins the thanks of the Association were voted to Mr. Chollar.

Mr. McMillin—Although I am to be the reader of the next paper, I am nevertheless not its author. Most of you who attended the meeting of this Association, in Columbus, Ohio, last year will remember that the Messrs. Korting, of Germany, had a gas engine on exhibition at our gas works, and those who were interested in bringing that engine before your attention were moved thereto by the advice of Mr. Ernst Schinrock, who, although now a resident of Brussels, is I believe a naturalized American citizen. That gentleman has written a paper, and sent it here to our Secretary to be read at this meeting, its purport being to describe the system of retort furnaces now used in the gas works at Rome, Italy. The author claims to have sent on detailed drawings of the furnaces, but unfortunately these did not come to hand.

Mr. McMillin now read the following paper (it bears date of "Rome, Italy, April 28, 1887"), entitled

JOTTINGS FROM ROME.

Mr. President and Gentlemen of the Western Gas Association:—Last year I took great pleasure to place before you, at Columbus, Ohio, the first Korting gas engine ever shown on American soil, and to-day I find only enough time to tell you what I saw Sunday last, in the most renowned city of the past, and also of the future.

When I came to Rome I scarcely thought that this place might one day have an attraction for American gas engineers, who generally only visit England and Germany, in their hurried rambles through Europe, in trying to discover something new for introduction in their home works. The cities, towns and villages in our beautiful American country grow so fast that American gas engineers have had little time to think of devices; but how to save money by inventing simple and efficient, as well as cheap, furnaces for the distillation of coals being an important question, you will excuse this introduction. However, I will now come to the point that the gas works of Rome, and especially their Chief Engineer, Mr. Walter Jones, must be awarded the honor of having in actual operation the most efficient, simplest and cheapest furnaces, for they differ entirely from all other ovens, as will be seen by the drawings I hereby send.

The furnace is called a duplex furnace, and the plan is to get a deep fire in the high temperature furnace; to do away with the firebars; using two nostrils in the hearth floor; and a second fire, or low temperature furnace, caused by the hot scoria and small fuel which falls through the nostrils, the air being first let in through the lower firebars. The combustion is finished in the upper chamber, or high temperature furnace. The whole arrangement is so simple and inexpensive that it bids fair to do away with regenerator furnaces. The repairs are *nil*—no repairing being required, as the scoria itself repairs the furnace. The firebars being done away with, no clinkering is needed. In fact, the treatment is opposed to the existing system, as no force is required, and the brickwork, instead of being knocked about, is tenderly used.

From these it will be seen that no high chimneys are required; no deck foundations used; no stage floors are needed; no expensive repairs; no waste of materials; and no skilled laborers.

I asked the engineer and constructor of these furnaces if he could not hurriedly give me some particulars which I would communicate to the members of the Western Gas Association; and the following is a copy of the letter I received from that gentleman:

ROME, ITALY, April 25, 1887.

ERNST SCHINROCK, ESQ.: Dear Sir—A duplex furnace does not require more than 50 ordinary firebricks over and above the quantity used in constructing an ordinary furnace. Besides these we have 544 kilos. of special lumps, which compose the bottom of the temperature furnace, and last of all we have two extra doors and frames weighing 260 kilos. The cost, at Rome, of these materials is something less than $25. This sum is saved in a very short period by the fact that no firebars are consumed, for the firebars in the low temperature furnace last the life of a furnace. The furnace outlives the duration of the retorts, because no clinkering is required. The repairs are *nil*.

The working results in 1886, in Rome, were as follows: The coal used was Newcastle, with 6 per cent. of Lancashire cannel. The average gas produced was 10,800 cubic feet. In the year, 49,485 tons of coal were distilled, and 27,627 tons of good coke were sold to the contractor, who cleared the yards each 24 hours. This gives 55.82 per cent. of coke sold on coal distilled, and the 12.66 per cent. of fuel used under the retorts consisted of 7.50 per cent. of coke and 5.16 per cent. of breeze dust.

Besides the above, 2.52 per cent. of coke was used at the works for other than firing purposes.

The total quantity of coke made per ton of coal carbonized was 710 kilos. (0.7 of a ton), and is accounted for as follows: Sold to contractor, 55.82 per cent., or 1,250.3 lbs. per ton of coal carbonized. Fuel used for gas making, 7.50 per cent., rest dust breeze—12.66; for sundry purposes, 2.52 per cent.; total, 71 per cent. In fact, it may be stated as 58.3 per cent. sold and 12.66 per cent. used for fuel.

During the year 1885, 16 Liegel recuperative furnaces were used here, but have been abandoned, as the maintenance was too costly, and the results obtained not so good as with the duplex system.

There are now in working order in the Rome gas plant 84 duplex furnaces. Tar can be burnt in a liquid state in these furnaces, without any alteration to the latter, and with great economy. An opening of 50 centimeters (20 inches) is left at the middle of the slot, which consumes the whole of the tar-coke formed during its burning, which does away with the necessity for clinkering, for everything is consumed. We find that for each ton of tar consumed we make a saving of one ton of coke.

The profit in 1885, by the use of the duplex system, was £2,500 sterling, when only one-half of the ordinary furnaces had been altered. The profit from increased sale of coke during last year, as compared with 1884, was about £4,000 sterling. Yours very truly,

WALTER R. JONES.

I can only add that the changing of old benches into the duplex ovens can be done within three days, at very trifling outlay for materials and labor. When in duty the saving of labor is great, and the manipulation of the furnace very simple, as compared with the old plan.

Whether it is advisable to introduce this duplex system into your American works I must leave to yourselves. It has already been adopted in several places in France and Italy, and Mr. Jones will gladly answer inquiries if further details are wanted. At the same time the Messrs. Jones, who superintend and manage the two Roman gas stations, invite their American brethren to pay them a friendly visit. A cordial reception awaits them, and they can then judge for themselves that Rome boasts gas works which can compare in internal improvements with any in the world of a similar size.

I hope, Mr. President and gentlemen, your time has not been taken up longer than 15 minutes, and that the intrusion upon your valuable hours will not have been without benefit to the members.

Discussion.

Mr. McMillin—It is unfortunate we have not received the drawings mentioned. It seems a remarkable statement that with an expenditure of about 50 bricks over those in an ordinary furnace, results can be obtained which enable them to sell over 50 per cent. of the weight of the coal in coke. That is about as much coke as we make when we use Ohio coal. I feel it is difficult for the Association to comprehend the construction of the furnace without the drawings. I am myself unable to see where any great benefit can be derived from this style of furnace, by passing the gas in through the scoria and small coke that falls down, the air being admitted at that point, and afterwards passed up through the main body of the coke. Unless that upper story of the furnace gets air from some other source, or there is secondary air introduced above the coke (of which he does not speak), I could hardly see how it would be possible for such results to be obtained. He has probably left that statement out. He could form carbonic acid in the lower furnace, and decompose it in the second chamber, and burn the carbonic oxide in the neighborhood of the retorts. That is possible. However, there are always two sides to these questions; and after spending a Sunday in an examination of a system of that kind, he might not become thoroughly competent to judge of its merits. The result, however, of the sale of coke by the year is certainly marvellous.

Mr. Lindsley—Has Mr. McMillin any idea as to the depth of the upper furnace?

Mr. McMillin—I have no idea of the depth of the upper furnace, but from the fact that it does not have any basement (for he speaks of that) and that it only takes fifty extra brick, we may conclude that it cannot be very deep unless the bricks are on end.

On motion of Mr. Lansden, the thanks of the Association were voted to Mr. Schinrock.

Secretary Littleton here read a paper, forwarded by its author (Mr. J. W. Dunbar, of New Albany, Ind.), who was unable to be present. The paper bore the title—

FURNISHING GAS WITHOUT A HOLDER,

and is as follows:

Having for a period of one week furnished gas to the citizens of New Albany without using a holder, or direct from retorts to the street mains, it may be of interest to those who may at some time be similarly situated to know the experience of one who so furnished it, and also the cause that occasioned the practice.

Our holder has a capacity of 60,000 cubic feet, our maximum daily sendout being 75,600 cubic feet, the minimum being 21,000 cubic feet. It was during the latter period of make that gas was furnished as above stated.

The inlet and outlet pipes to holder are 10 inches in diameter, being (in their upright position inside of holder) 2 feet apart. It was because first one and then the other admitted water through the lead joints on inside of holder, together with the leaky condition of the rivets and the seams of the iron, which leakage at one time amounted to as much as 20 per cent. of the gas produced, that necessitated this undertaking. The outlet pipe had been abandoned for several months, while the inlet one was admitting water to an extent that made the situation very alarming, so it was determined, as we have only one holder, to abandon it to repair leaks to stand-pipes, and to see what could be accomplished in the way of preventing the enormous leakage.

We have at our works 5 benches of threes, 4 of which were fired preparatory to commencing operations. Sunday was the day which I deemed best to commence operations, on account of the small amount of gas required on that day, as well as on account of it being the commencement of the full phase of the moon; but our President had no faith in the success of any undertaking commenced on the Sabbath, so it was deferred until the next day. The first thing to do at holder was to get 500,000 gallons of water out of the tank. On account of very low adjacent ground I was able, with two 3-inch siphons, to get out considerably over one-half of the water; a city steam fire engine was used to pump out the remainder, which operation required until up to midnight of Monday. Previous to siphoning out the water, however, the tank had been filled full of water, so as to leave as little gas in holder as possible when it was down, and the man-heads were first removed, care being taken, for a short time, that no fire was brought in the immediate vicinity. On Tuesday morning, six hours after tank was emptied, we were able to descend upon inside of holder—without experiencing any bad effects from foul air—to examine stand-pipes, which had been previously filled with water, in order that we might the more readily find the leaks. Fortunately we had no trouble in this. The stand-pipes are about 2 feet apart. Two lengths had been required to reach proper height, necessitating a lead joint, on both the inlet and outlet pipe, about 7 feet from the top. The leakage was found to be in there. The outlet pipe could be made to vibrate as much as 5, and the inlet pipe as much as 3 inches. All we found necessary was to thoroughly caulk the joints, which stopped the leakage, and we have had no like difficulty since.

In this connection the question as to what caused the leakage naturally arises. I can only account for it by supposing that the water, during an unusually cold spell, congealed upon inside of holder, and the expansive action of the ice caused the pipes to become separated or drawn further apart—for it was during one of the cold spells that the leakage commenced. The following summer the leakage was no worse than in the winter spoken of, but in the following winter, during extreme cold weather, the outlet pipe had to be abandoned on account of increased leakage, while the inlet was called on to perform the duty of the outlet in addition to its own work. Our holder is some distance from the works, so that (having no steam) it is impossible in winter to keep the tank water from freezing around the holder, thus necessitating the breakage and removal of the ice by means of manual labor. The average temperature at which our gas was registered during these extreme cold spells reached the low mark of 38° F., which, when subjected to further exposure, while in holder, with the atmospheric temperature ranging from zero to 15° below, the gas no doubt was below the freezing point. If anyone can account for this leakage by any other theory I shall be glad to have his opinion.

Having repaired the stand-pipes we next turned our attention to the devising of means to prevent the enormous leakage. In some places we found the holder seams were sufficiently parted to admit of the insertion of an ordinary knife blade between them. These we filled with a putty composed of litharge, red and white lead, worked with glycerine. That mixture hardens shortly after having been used. We found that many of the rivets had not been driven up as tight as they should have been, so these rivets on the inside, together with the seams, were given a coat of the mixture spoken of, care being exercised to thoroughly work the paint into all the cracks and crevices. When this was completed the tank was filled with water and the gas admitted to holder, the first 8,000 to 10,000 cubic feet being permitted to escape. I may say that the painting of the rivets, together with the filling up of the cracks in seams, as above described, caused our holder to become a perfectly tight one. In fact all the labor now required on it is to paint it twice a year, which operation takes us but a few days, whereas formerly it required the expenditure of about three weeks of work at least twice each year. Previous to our successful attempt we tried everything suggested to prevent leakage, and while the leaks would be temporarily checked, yet, and in very short time, the holder would leak as badly as before. My opinion is that a leaking holder cannot be made tight by work done upon it from the outside, chiefly for the reason that the paint cannot be so easily and thoroughly applied. Again, after it is externally applied there are many things that act to remove it.

In furnishing gas without a holder we experienced no difficulties except during the first night, and these only lasted for a short time. In winter we give 1.9 inches and in summer 1.2 inches pressure, the latter amount being all that is required in that season.

When night of the first day approached we began charging our retorts, and ran the pressure up to 3 inches, at which point I determined to keep it; but it soon decreased, and with such rapidity that we could not check its downward course. It went as low as five-tenths, at which figure it remained only for a short time, or until the remaining retorts were charged, which action brought up the pressure to over 2 inches. Shortly thereafter our washer choked on us, and the pressure was again lowered to five-tenths. To remedy this we turned on a by-pass, and the pressure was once more raised to 2 inches. The next night I commenced charging the retorts earlier, and ran up the pressure to 5 inches before I stopped charging. When it commenced to go down we again charged more retorts, until finally all were charged. The coal was then permitted to remain in retorts until the pressure got down to 2 inches, when the retorts that were first charged were drawn and recharged; and so it continued through the night. No street lamps were lighted, except for a few hours on one night. Not much work was required, except for a few hours between 7 and 10 P.M. The quantity of gas made per hour was about 8,000 cubic feet. The weight of coal charged was about 325 pounds to the retort.

On the evening that the street lamps (475 in number) were lighted, our make was about 11,000 cubic feet per hour. We were able with this send-out to maintain 1.3 inches pressure. During the day we examined every stand-pipe, so as to have it clear at night, and also examined thoroughly the washer—in fact every pipe which we thought would be liable to choke up. Everything worked satisfactorily. No complaints were heard from the consumers. The illuminating quality of the gas was above the ordinary candle power, which, with an increase of pressure, caused the gas to be satisfactory to all who consumed it.

[A vote of thanks was passed to the author, owing to whose absence the paper was not discussed.]

ELECTION OF OFFICERS.

Mr. Jenkins from the Committee on Nomination of Officers presented the following report:

Gentlemen:—Your Committee on Nomination of Officers for the ensuing year beg leave to report as follows:

President—Emerson McMillin, Columbus, Ohio.

First Vice-President—Geo. G. Ramsdell, Vincennes, Ind.

Second Vice-President—E. J. King, Jacksonville, Ills.

Secretary and Treasurer—A. W. Littleton, Quincy, Ills.

Board of Directors—A. E. Boardman, Macon, Ga.; Geo. H. Wells, Nashville, Tenn.; A. T. Averill, Cedar Rapids, Iowa; R. C. Johnston, Lawrence, Kas.; Eugene Printz, Zanesville, Ohio; W. H. Odiorne, Springfield, Ills.; Frederic Egner, St. Louis, Mo.; C. H. Raynor, Adrian, Mich.; E. G. Cowdery, Milwaukee, Wis.

[Signed by the Committee.]

Mr. McMillin—Before action is taken on the report I suppose that remarks are in order. I know that every gentleman here realizes the fact that I appreciate the nomination to the Presideney of this Association, and I am probably as ambitious as anyone here; but there is a limit to one's ability to attend to these outside matters. I have just retired from the Presidency of the Ohio Association, and would feel greatly relieved to come in here at a later period—say ten years from now. If Mr. Ramsdell were here he would doubtless make the same sort of speech; but in his absence we could play a very nice practical joke on him by electing him President. In all seriousness I ask the Association to substitute Mr. Ramsdell's name for mine. The Presidency of these Associations does require a great deal of attention, and I would be glad to have

at least a few years vacation after retiring from the Presidency of one Association before I accepted the Presidency of another.

Mr. Lansden—I move that the report of the Committee be accepted, and that Mr. Jenkins be instructed to cast the vote of the Association in accordance with the recommendation of the Committee.

[The motion was carried. Mr. Jenkins announced the result of the ballot, and the President declared that the gentlemen recommended by the Nominating Committee had been elected to serve as officers of the Association during the ensuing year.]

Response of the President-Elect.

Mr. Howard—We would like now to hear again from President-elect McMillin.

Mr. McMillin—I suppose it would hardly be in order to say that I sincerely thank you for the election; but if there is anything in the world that would compensate me for the disappointment in being elected, it is found in the fact that I am associated with the gentlemen named in that list—with such men as Ramsdell, King and Littleton, to make no individual mention of the Board of Directors, who are entirely too numerous for me to remember their names. I will doubtless be able to shift a great deal of responsibility and labor from my own shoulders to theirs; and that idea having occurred to me since I made my last speech, I do now sincerely thank you for the election. (Applause.)

Report of Committee on Place of Meeting.

The President—We are ready for the report of the Committee authorized to select a place wherein to hold the next meeting.

Mr. Cosgrove reported that the Committee had decided to recommend Cincinnati, Ohio.

Mr. Lansden—I thought at one time it was well understood that the Western Association should hold one meeting at St. Louis, Mo., next at Chicago, Ills., and then go to Cincinnati, O., returning to St. Louis, on to Chicago again, and then to Indianapolis, Ind. We have now twice visited the extreme border, but last year the meeting was held at Columbus, Ohio, while now we are in St. Louis. This is not the heart of our district; but Chicago comes nearer than Cincinnati to being the most convenient for the largest number of our members. If we meet on the east side too often I do not think we will have the same success. Cincinnati is a very nice place to go to, and would properly come in, in its course, the following year.

Mr. Egner—I am very sorry to see that Mr. Lansden has lost all local patriotism, and I say it as an adopted St. Louis citizen. He deliberately proposes to adjourn at St. Louis to meet at Chicago. I hope, rather than do that, he will stick to the report of the Committee and go to Cincinnati. I do not wish to say anything about Chicago—there are some nice men there; but don't let us go from St. Louis to Chicago. (Laughter.)

Mr. Lansden—I am certainly interested in the success of this Association, and come to think of it, I believe that Brother Egner has met with us only once before the present time. I have been with the Association since it started, and think the interest of the Association demands that we should meet at times in the center of our territory, or at points where we can most conveniently meet. I hardly think it is to the interest of the Association to assemble in two successive years on the extreme eastern border of our territory.

Mr. McMillin—It would certainly afford me great pleasure to have you come to Ohio, for that seems to be the place for holding good meetings; but I am a little inclined to side with Lansden, for once in my life. The Ohio Association holds its annual meeting in March, and as almost all of the Ohio men now belong to that Association the attendance is very good. Of course, when you leave St. Louis and Chicago, to go over into Ohio, you must miss some of the far Western men, and you expect to make that loss up by securing the attendance of those further East, in order to have the usual number present at the meeting. As this Association holds its meeting so soon after that of the Ohio Association—the one being in March, and the other in May—I doubt very much if the attendance from the Ohio members would be large enough to compensate for what we would lose in attendance from the far West. I rather hoped that our next meeting would be in Louisville, Ky., and that we should pay a little deference to our Southern members—they are getting to be quite a factor in this Association; but the Committee, doubtless, have good reasons for suggesting Cincinnati. I want to offer the one suggestion that as the Ohio Association meeting takes place within 60 days of the meeting of the Western Association, it would very seriously interfere with the attendance of the Ohio members, or to such an extent that you could hardly make up in Ohio what you lose from cities so far west that the members would not feel able to come.

Mr. Jenkins—Perhaps the Committee have some reason for making this change.

Mr. Cosgrove—We had no personal preference for the location of the next meeting, but aimed to do that which seemed to be for the greatest good of the Association. Remembering that three years ago we met in St. Louis, two years ago in Chicago, and last year at Columbus—taking it away then from Cincinnati—we thought it best to recommend that the next meeting should be in Cincinnati. If we confine ourselves to this radius, alternating between the three large cities, Cincinnati would certainly be entitled to it next year. I think we have had but one meeting of the Association in Cincinnati. There was a preference expressed in a quiet way in behalf of Louisville. I felt very favorably towards having it there; but as no overtures (at least that I have heard of) from Louisville were put forward by the gas men of that city, we did not feel like presuming on her people. I shall be satisfied, as one of the Committee, to have the next meeting at Louisville, if such is the sense of the Association. The Committee are not at all arbitrary in the matter.

Mr. Barret—Speaking for the gas men of my city, I should be most happy to have the Association meet at Louisville. I did not deem it necessary to extend a formal invitation, supposing you would take it for granted that we would be glad to have you visit us. That invitation is now formally extended to you, is frankly given, and I hope it will be accepted.

Mr. King—This discussion seems to come up at almost every session of the Association, and we have always decided to take the regular course. The mapping out of this triangle of cities was proposed and agreed to for the reason that it gave the members of the different sections an opportunity once in three years of having a meeting near their own homes. If that be the idea, and this time we change our course and go to Cincinnati, because we did not go to Cincinnati last year, then next year we would probably go to Chicago, and the year after come back to St. Louis, thus holding the meeting here at an interval of only two years, and hence we would inflict ourselves upon the St. Louis people again in two years instead of three. It seems to me that in due time we will get around to Cincinnati and Louisville—I would myself like to go to Louisville; but it seems to me better to follow the regular course that we have heretofore adopted.

Mr. Lansden—I only desire that which is for the best interest of the Association. The success of our Society depends, to a great extent, upon the number of members who attend its meetings. I think if we have meetings at the extreme borders of our territory we will not be able to secure the attendance of as many members as we would if we followed the course heretofore pursued.

The President—Mr. Lansden, if you want to change the plan, why not make a motion to that effect.

Mr. Lansden—I move that the Association establish a permanent system of meeting; that they meet on the South one year, on the North one year, and on the East—either at Cincinnati, Indianapolis or Louisville—the third year; at St. Louis on the fourth year; on the fifth at Chicago; and then revert to the eastern cities again.

The President—To make that a permanent arrangement the resolution would have to be put in writing and laid over until the next year. All that you can do now is to make a motion as to where we shall meet next year. If you want to make a permanent arrangement you must make an amendment to the by-laws.

Mr. Howard—If our success in the past is any criterion I would call attention to the fact that the meeting at which we had the largest attendance, and the most satisfactory in other respects as well, was the one that was held in Cincinnati.

Mr. Lansden—I think there is a good deal in the suggestion made by Mr. McMillin that they are surfeited with gas conventions in Cincinnati; and it may not be well for us to meet in Cincinnati so soon after the meeting of the Ohio Association.

The President—But the Ohio Association does not meet in Cincinnati next time; the Convention for 1888 will assemble in Sandusky. There is only one city mentioned in the resolution. If no amendment is proposed I will put the question on that resolution.

Mr. Lansden—I move to amend by substituting Chicago for Cincinnati.

The amendment of Mr. Lansden was agreed to, and the Association voted to hold its next annual meeting at Chicago.

Election of Honorary Members.

Mr. McMillin—We have here with us to-day the gentleman who occupies the position of Secretary of the American Gas Light Association. He is skilled in the profession which we follow, and is an honored member of the fraternity. He is a gentleman whom you will all be glad to know and to associate with. I nominate Mr. C. J. R. Humphreys, of Lawrence, Mass., the Secretary of the American Gas Light Association, for election to Honorary Membership in this Association.

The nomination was seconded by Mr. Howard, and the Secretary was instructed to cast the ballot of the Association, in accordance with the proposition made by Mr. McMillin. The Secretary having carried out the instructions, the President formally welcomed Mr. Humphreys to Honorary Membership. Mr. Humphreys made the following response:

I am greatly surprised at this action. I had no idea of being so honored. I wish to express to you, one an all, my sincere thanks for the honor, and my assurance that I fully appreciate an election to such membership in so energetic an Association.

Mr. Lansden—The New England Association saw fit, at its last meeting, to honor one of the members of the gas fraternity who, although now bearing manfully and patiently a severe affliction, is nevertheless now as active in mind in following out the complexities of our business as he was energetic in personal action when in possession of robust health. I refer to Mr. Geo. A. McIlhenny [applause] of Washington, D. C.; and I move that he be elected to Honorary Membership in this Association.

The nomination being ratified, the Secretary, by request, cast the ballot of the Association in favor of Mr. McIlhenny's election. The result, when announced by President Fullagar, was received with cheers.

Mr. Howard—I desire to place in nomination for election to Honorary Membership in this Association a gentleman who is well known to you all, and I think everyone will agree that he merits the elevation which such action on your part will award him. He was Secretary of the American Association, and he served its best interests faithfully and well. He has been a frequent attendant at the meetings of this Association, and his visits here have been appreciated by us. I now move that Capt. W. Henry White, of New York city, be elected to Honorary Membership in the Western Association.

The motion, seconded by Mr. King, was agreed to, and the Secretary cast an affirmative ballot. Capt. White having been declared elected an Honorary Member, was formally introduced to the members, and responded to the compliment in his usual genial and happy manner.

An Amendment to the By-Laws.

Mr. McMillin—In looking over the by-laws I noticed that the portion governing the election of Honorary members is decidedly obscure; and in order to make such practice plain in the future I herewith submit the following amendment:

Honorary Members.—Section —. The Board of Directors may in their discretion recommend to the Association, for election to Honorary Membership, persons who may be eminent for their skill, or mental acquirements, in the manufacture of gas, or in gas engineering; and, when so recommended, the name or names so proposed shall be voted on, in the usual manner for election to active membership.

Honorary members shall not be required to pay dues.

[Under the rules the McMillin amendment goes over, to be decided at the next annual meeting.]

Letter from Mr. Spencer.

The Secretary here read the following letter, from Mr. R. Spencer, of Burlington, Iowa:

To A. W. Littleton, Secretary Western Gas Association:—You ask me to contribute a paper for use at the May meeting of our Association, but I must not attempt it. I cannot edify you, therefore I will not bore you with commonplaces from my poor experiences. I am superannuated; absolutely shelved; practically out of the business. Despite that state of the case, I yet am desirous to acknowledge my indebtedness to and appreciation of the great value of the Western Gas Association, hence I have thought it not improper to show my good-will to you in a more modest and less pretentious way.

I regret that an engagement in New York will not permit me to be with you on the occasion referred to, to greet you all, as of yore, with joyousness—as no other experiences of my past life have given me more real pleasure. Aside, also, from the pleasure of meeting my brethren on these interesting occasions, I am impressed with the inestimable value of this and kindred Associations to their members professionally; and, through them, to the companies they represent, to the communities in which these companies are located, and to the whole people. Organized as we are, and meeting from year to year to discuss the best methods of construction, the best adaptation of means to ends, in distribution and administration, without antagonisms, without conflicting interests to mar the harmony of our meetings, with only a spirit of emulation to stimulate us all to our best endeavors for the advancement of the common cause, the results of our combined efforts cannot help being in the interest not only of the gas fraternity, but, through it, to society generally.

I cannot forbear in this connection to mention how much, in my humble judgment, this Association is indebted for its rapid growth, its interesting history, and its great usefulness, to the manly dignity, the wise councils, the uniform courtesy and forbearance of its first President, Mr. J. O. King,* the mention of whose name brings only pleasurable emotions to every member; whose every joyous experience in his declining years will give pleasure, and whose every sorrow will elicit the heart-felt sympathy of all.

As I write, the figure of our second President, Mr. Thomas Butterworth, arises before me in that robust and vigorous attitude so characteristic of him. Cut down in his prime, in the midst of his active usefulness—to our weak and finite perception, all too soon. Yet, realizing our shortsightedness, we must conclude that the Infinite Father had a higher sphere of usefulness for him in the Eternal City, illumined not with our poor product, but with radiance from the glory of the Divine Humanity. We cannot but mourn his loss. We will cherish his memory, and try to imitate his virtues.

Starting, as this Association did, under the wise leadership of the above-named presiding officers, and continuing under that of men happily chosen with special reference to their fitness for leadership, its affairs have always been conducted with signal ability; its meetings have been presided over with that dignity which commands respect and consideration; and its discussions have been conducted with animation, giving growing evidence of vigorous thought that tended to root out the unsound dogmatism of the past, arousing a determination to discover the truth and follow it withersoever it might lead, regardless of consequences to old maxims and pet theories.

This hastily written and very imperfect review would not only be incomplete, but great injustice would be done, did I omit to mention the worthy Secretary of this Association, to whose untiring industry and persistent effort so much of its success is due. Ever present, as it were, to each member with written letters, with printed circulars, urging them to vigorous action, in season and out of season (if that were possible), inspiring them to more persistent effort to build up and strengthen our Association for more active work and a wider sphere of usefulness.

As an humble member, I am proud of this Association. Proud of its past history; of its great achievements. And my hope, as well as my confident expectation, is that its future will not only realize what its past history and its present prosperous condition promise, but that its sphere of usefulness will be greatly enlarged, and its efficiency much increased, to the end that its members may become more and more indispensable in their sphere of life to the communities in which their lots are cast.

(To be continued.)

A Glance at Some Past Projects for the Manufacture of Oil Gas.

Mr. N. H. Humphrys, F.C.S., etc., contributed the following interesting communication to a recent issue of the London *Journal*. The author wrote:

It is scarcely necessary to mention that the idea of gasifying hydrocarbon fluids is in no sense novel, as it dates back to the time when coal gas was first introduced. On account of the large yield of high quality gas that can be obtained from a suitable kind of fluid, it has always been a favorite with inventors in the "household gas works" line, who have aimed at enabling every householder to be his own gas maker, so that he may supply himself with as much gas as he requires, by means of a small retort attached to the kitchen range. It is not too much to say, perhaps, that gas making on the "household" scale can be carried on more successfully by means of a light oil than with coal. Looking back over the numerous ideas that have been proposed, some of which have been put into practice on the small scale, to a greater or less extent, it will be seen that many of them are extremely ingenious, and show a fair state of knowledge as to the conditions necessary to be observed. In many cases the apparatus is intimately linked with that used for coal and other solid materials. The plan patented by Hillary in 1846 may be cited as an example. His idea was to place the condenser (which was the common vertical arrangement) at an elevation above the retort, so that the condensed liquid could be returned into it. The retort was of the ordinary horizontal kind. In place of the ascension-pipe, however, there were three pipes; and these, instead of terminating inside the mouthpiece, curved at right angles, and extended nearly to the back of the retort—being situated close to the interior top surface. The retort was made sufficiently large in section to contain these pipes, and leave the usual space for coal, etc., besides. The center pipe formed the outlet for the gas; and the side ones the oil or tar pipes, which returned the

* Mr. Spencer's letter was written about a week prior to the decease of Ex-President King.

fluid from the condenser into the retort. Evidently, what is aimed at here is that the liquids on traveling through the hot pipes should be gasified. The vapors, escaping into the retort, would there mix with the gases evolved from the solid fuel, and pass off with them along the center pipe, which is maintained at the same temperature as the retort; being thoroughly mixed therewith, and, to use the popular expression, "fixed" by contact with the red-hot surface. This apparatus is mentioned because it combines nearly all the features of oil gas apparatus at present manufactured. The main idea seems to be that there should be no liquid residuals; the whole being converted into gas, or else deposited in the retort.

There is one remarkable difference in practical detail, as compared with the method of distilling coal for the production of gas, that is universally followed by oil gas makers. The rule in ordinary gas works is to get the gas out of the retort as rapidly as possible, so that it shall not come into contact with the red-hot surfaces, the interior of the retort, and the incandescent coke, more than can be helped. But in oil gas apparatus the gas, after being formed, is designedly brought into contact with red-hot surfaces, in order to "fix" it. In the original patent of Taylor, taken out in the year 1815, the arrangement resembles two tube retorts; the oil being gasified in the first, and the gas being fixed in the second. With the same object in view, changes have been rung by subsequent patentees on the use of two or perhaps more separate retorts, either empty or charged with materials calculated to assist the "fixing" process; on single retorts having tubes inside, or divided by diaphragms or partitions in such a manner as to afford the nascent gases a long extent of travel; or retorts U-shaped in longitudinal section; and on combinations of tube retorts. Of these, the twin retort patented by Laming and Evans in 1850 may be instanced. This consisted of two horizontal retorts joined together at the back, having a mouthpiece there common to both, and a separate mouthpiece to each at the front. This arrangement could be made in one piece, if desirable, and was so placed that one limb came exactly above the other. The ascension-pipe was situated on the lower mouthpiece, and both retorts could be charged and worked with any solid gas-making material. On the upper side of the top retort, toward the front, but still a sufficient distance therefrom to be situated at the hottest part of the retort, an inverted funnel-shaped attachment rises, extending out through the top of the setting, and closed with a suitable lid. A wrought iron tube, with a syphon seal and funnel, is screwed into this lid; so that oil, tar, or any suitable fluid may be dropped in regulated quantity into the heated retort. The gas generated by this means had to travel along to the back of the upper retort, then descend to the lower one, and flow through it to the mouthpiece at the front. In effect it was simply another and apparently a more practicable way of carrying out the ideas which animated Hillary and his predecessors. The oil gas, after generation, was caused to pass over a considerable extent of heated surface; and facility was also given for enabling it to mix with inferior gas from cheap coal or other material.

It will be observed that both the inventions above named afford ready access to all parts for the removal of deposited carbon. The Laming and Evans apparatus especially has no small tubes or parts where such would be likely to give annoyance, and shows signs of having been specially designed with this point in view. Judging from many of the forms of apparatus which have been proposed, considerable trouble has been experienced from deposits of solid carbon, and arrangements have been made for its removal. When the liquids are used in connection with solid material, the removal of the coke or debris left from the latter also brings with it the deposited carbon. In apparatus for liquids solely, many different expedients, some of an extremely ingenious character, have been suggested. Taylor, in 1815, placed his tube retorts at an inclination from the horizontal, and allowed the liquid to enter at the higher end; so that any portions escaping gasificatiou for the time should trickle downwards, and so come in contact with fresh areas of red-hot surface. This idea has been repeated over and over again in one form and another. Many mechanical contrivances have also been introduced. One inventor uses an upright retort, and fills it with suspended chains, which are caused to "clank" one against the other by a simple mechanical device that can be actuated from the exterior; thus dislodging any deposited carbon and dropping it to the bottom, from whence it can be raked out by a side door. Mr. Goldsworthy Gurney, in 1862, adapted an ingenious arrangement to a round horizontal retort. A steel rod, working in a stuffing-box at one end, carried a half round hoe or scraper, fitting loosely to half the section of the interior of the retort, and also a "fin" or stirrer, consisting of a piece of steel, attached to the end of the rod at right angles, opposite to the hoe. On the outside of the setting, under the mouthpiece, was a recess or chamber, into which any accumulated matter could be raked. By this means any carbonaceous deposit could be removed from the retort whilst in action. Messrs. Porter and Lane also proposed to adapt their well-known "screw retort" to the same purpose.

Others have sought to utilize the excess of carbon by converting it into carbonic oxide, in which case it would go to increase the bulk of the gas produced, though of course acting as a diluent. This was effected by introducing oxygen, either in the form of air or steam, into the retort. The objection to the admission of air is the loading of the gas with a large quantity of inert nitrogen. For the gasification of 6 lbs. of carbon, 8 lbs. of oxygen are required, or, say, 40 lbs. of air; from which it appears that, for the effective treatment of 1 lb. of carbon, something like 90 cubic feet of air, including nearly 70 cubic feet of nitrogen, will be needed. If steam is used the nitrogen is dispensed with; the result *in theory* being the formation of hydrogen and carbonic oxide gases, both of which are useful as heat producers. One pound of carbon should require 1⅓ lbs. of steam, and should form therewith 2⅓ lbs. carbonic oxide (31⅓ cubic feet) and ⅓ lb. of hydrogen (31⅓ cubic feet). So the total bulk of diluent gas produced will be considerably less than that resulting from the use of air; and it will also be of more suitable quality, as the hydrogen assists in producing heat.

The difficulties in the practical application of this plan are numerous; but two may be specially named. These are: The poisonous nature of carbonic oxide; and the formation of a considerable quantity of carbonic acid, which deteriorates the value of the gas, and is costly to remove. Whatever the advocates of water gas may say, there is little question as to the danger and risk connected with the supply of a gas containing a large percentage of carbonic oxide. It has been proved that this gas is an active poison—about 100 times more injurious to animal life than carbonic acid. Possibly very light fluids, having a specific gravity of not more than 0.7, might be entirely converted into gas with the aid of steam. For example, a sample of commercial "benzoline" experimented upon by the writer yielded 107.5 cubic feet of gas per gallon, no tar, and only 1,250 grains of carbonaceous soot. The latter could be converted into gas by the addition of 1,875 grains of steam; the resulting product being about six cubic feet of carbonic oxide, and a corresponding quantity of hydrogen. This, added to the 107.5 cubic feet, would not produce too large a proportion of the poisonous element, nor would it dilute the gas to an undesirable extent. But it would never do, in practice, to be dependent upon an artificial product for a supply of gas-making material; so that this must not be taken as an indication of what could be done in everyday operations. The gas engineer would have to be prepared to deal with liquids yielding 20, 30, and perhaps nearly 40 per cent. of carbon and pitchy matters. Another difficulty is that a considerable extent of contact with red-hot surfaces is necessary for the formation of carbonic oxide; and this will have an injurious effect upon the light-yielding hydrocarbons, not only impoverishing the gas, but leaving as much carbon behind as is taken up as carbonic oxide. So far as existing or hitherto proposed forms of apparatus are concerned, the gasification of the carbon by the introduction of oxygen, either through the medium of steam or air, is impracticable. By the time the carbon was gasified the light-giving power of the gas would be reduced to a very low quality. This objection does not apply in the case of heating gas; and therefore, where the production of a fuel only is desired, it is quite possible to completely gasify the carbon.

If we look in the direction of the addition of a hydrogenous gas of poor quality to the oil gas, which could be done by means of either of the appliances already described, the retort being charged with the inferior coal, wood, or whatever the material may be, the prospect is more hopeful. It is known that the admixture of hydrogen with a rich gas hinders the decomposition, and consequent deposition of carbon and deterioration of quality, which results from its exposure to contact with red-hot surfaces. If olefiant gas is caused to pass through a tube raised to high temperature it is converted into marsh gas, with deposition of solid carbon; but if the olefiant gas be first mixed with an equivalent bulk of pure hydrogen, this action becomes limited to a great extent. If the experiment is repeated under the same conditions as before, only a little carbon will be deposited, and the illuminating value of the mixture will not suffer much. Consequently, while admixture with a poor quality of coal gas, or a gas similar in nature, will not lead to the reabsorption or gasification of carbon already deposited, it is evident it will greatly hinder the formation of such deposits.

But it has repeatedly been shown that the mere retention of carbon in the gas is not all that is to be looked for, in the securing of the best results as regards illuminating value. Many years ago there was a notion prevalent to the effect that the proportion of carbon in the gas had some relation to the illuminating value of the same; but we now know that this is not necessarily the case. It has been shown, for example, that

benzene (C_6H_6) is a better illuminating agent than ethylene (C_2H_4), to an extent greater than that proportioned to the larger quantity of carbon present in the former. So it is essential, in solving the problem of how to extract the best possible illuminating value out of any substance, not only to consider how to retain as much carbon as possible in the gas, but also how to retain it in the most suitable form. Gas engineers have found, from practical experience, that the best results are obtained from coal by the use of high heats, which secure rapid generation of gas, coupled with the removal of the gas as fast as it is made. It remains to be shown whether this point is confined to coal only, or whether it is also true as regards fluid hydrocarbons. It is directly opposed to the "fixing" process, or the conducting of the gas through a second retort, which is so dear to the hearts of oil gas inventors. For it is evident that this plan, applied to coal gas, would not only result in a depreciation of illuminating value to an extent proportioned to the amount of carbon deposited, but there would also be a loss in a greater degree.

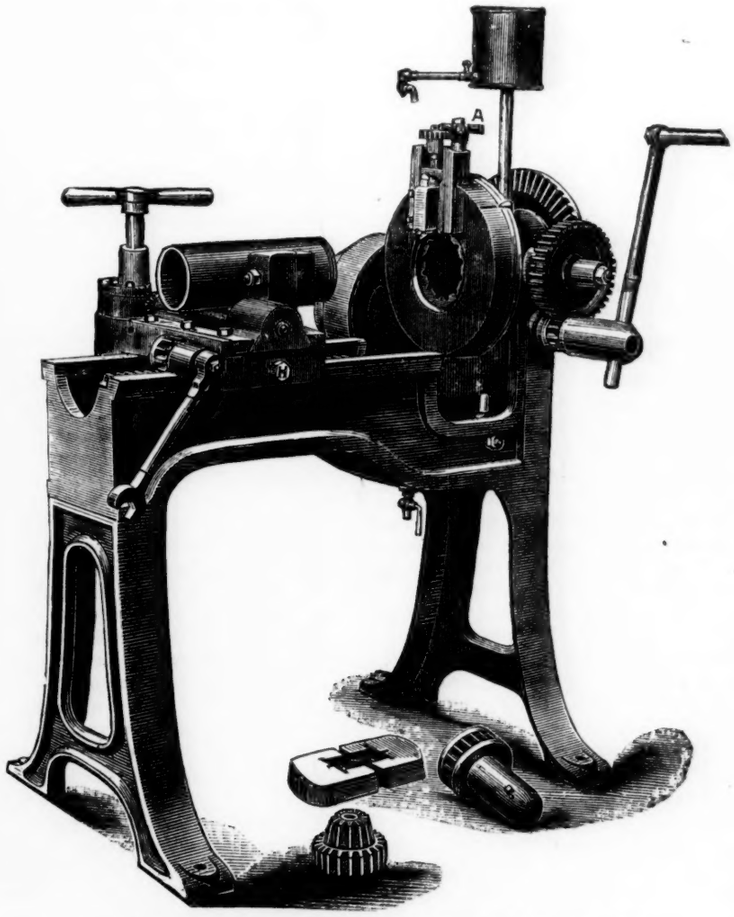
Tube Cutting and Screwing Machine.

At the Manchester Exhibition, Messrs. John Cowley & Son (of No. 6 Clarendon street, Hyde, England) displayed a large assortment of hand and machine screwing devices, capable of screwing bolts and nuts up to 1½ in. in diameter at one operation. They also exhibited a new design of machine for screwing gas and steam pipes up to 4 in. in diameter at one operation, an illustration of which accompanies this notice.

A slide rest and cutter is provided on the revolving die stock for cutting off nipples and various lengths of pipes. The cutter or tool used is of peculiar construction, in that it is composed of three pieces, the center one being a plain square-nosed parting tool, and the two side ones pointed and beveled. When plain pipe cutting is required, the center one only is used, by being made to project more prominently than the others; but when nipples are required the two side tools are used as well as the center one. This leaves the ends of the nipples beveled off without damaging the threads—a result not obtained by ordinary machines. The end of the slide rest screw is provided with a wheel on the rim of which there are projecting arms, so that at every revolution of the cutter one of these arms catches on a stop and partially turns the feed screw and puts on the cut.

The screwing dies have a large number of cutting edges in order to keep thin pipes perfectly cylindrical when being screwed. This arrangement secures a tighter joint and prevents the longitudinal cracking which so often occurs with dies having only four cutting edges, for when pressure is applied to such dies they press the pipe out of shape, and consequently subject it to a constant bending as they revolve; this very soon cracks and destroys thin pipes, especially when they are not of the best material, such as gas pipes.

The cut is put upon the dies by means of a spiral cam plate, which is fitted with an index. By this device the dies can be set to screw any standard size at one operation. The vice jaws for holding the work are tightened by a screw which is fitted with a worm and wheel in order to get a firm grip on the work. A complete set of dies and vice jaws are provided for all sizes of pipes. Many of the large steam and gas pipes used in the Exhibition were screwed by this machine in its present position.



Cowley & Son's Tube Cutting and Screwing Machine.

The Electric Light at the Suez Canal.

Engineering says that the Cairo correspondent of a Glasgow paper has recently been engaged in making an inquiry regarding the use of the electric light in the Suez Canal. He says that the use of the electric light for navigating the Suez Canal by night is feasible as regards mail steamers and men-of-war, though whether it will remain in use permanently is open to doubt. As regards ordinary steamers, officers and crews of which are not so numerous and efficient as those of the men-of-war and mail vessels, the use of the electric light is likely to prove a delusion and a snare. Going southward, in the full glare of the Egyptian desert, facing the sun, unfits him much at nightfall. If at that time he exchanges the blazing sun for the dazzling electric light, by the time the vessel gets out of the Suez Canal the dazed and jaded skipper cannot be in a fit condition to take his ship the next night through reefs which abound in the Gulf of Suez, and the endeavor to avoid which calls for his utmost vigilance, care, and skill. The writer goes on to say that after a few outward-bound ships have knocked their bottoms out in that part of the world, the underwriters will awake to the fact that the electric light in the Canal is to a great extent to blame for those catastrophes. Homeward-bound commanders, after running the gauntlet of the Red Sea shoals and the risks of the Gulf of Suez, find the Suez Canal a sufficiently tiresome business by day; but to do it by night in addition, by the aid of the electric light, means that by the time they reach Port Said every man on board will have been worked to death.

It is, he further says, hard enough in the daytime to get vessels safely by the dredgers and hoppers in the canal, but at night, when the dredgers chiefly work, the difficulty will be enormously increased, and particularly as extension works are supposed to be now going on.

No effort has been hitherto spared by the Canal Company to make the use of the electric light a success, so that as yet there has been an immunity from accident, which is regarded as being somewhat surprising. But when, in consequence of the difficulty of judging distances by means of the electric light, another dredger is capsized across the canal, or some ship is sunk in collision, causing another fortnight's delay, shipowners will perhaps begin to doubt whether this application of the electric light is such an unmixed blessing after all.

Regulating the Storage of Inflammable Substances in the District of Columbia.

The Commissioners of the District of Columbia, acting under the provisions of an act of Congress, approved Jan. 26, 1887, have published the following "police regulations" concerning the storage and sale, within the limits of the District, of the articles named:

"SEC. 1. No crude or refined petroleum, benzine, naphtha, turpentine, gasoline, or other highly inflammable oils or substances shall be stored

in any frame building or structure, or in any yard, or on any avenue, street, alley, sidewalk, parking, park, intersection, reservation, or public space within the District of Columbia; and all such articles and substances shall be removed by the consignee thereof from railroad depots or other places of consignment within 24 hours after notice of the arrival of the same.

SEC. 2. It shall be unlawful for any person to store or hold within any building in the District of Columbia, in any quantity whatsoever, any oil or any fluid made from petroleum or its product which will flash or give off an inflammable vapor at a temperature below 120° F., or have a density below 49° R. The chemist of the District of Columbia shall make the inspections and apply the tests provided for in this section.

SEC. 3. It shall be unlawful for any person to store or keep for sale in the District of Columbia any inflammable oil or fluid composed wholly or in part of petroleum, or any of its products, or any other highly inflammable fluid, without an annual license therefor first obtained from the Commissioners of the District, as provided in this article. Every person desiring such license shall make application therefor in writing to the said Commissioners, which application shall state the place, building, or part of building, in which the applicant desires so to store or keep such articles or any of them; and the said application shall be referred to the Inspector of Buildings and the Chief Engineer of the Fire Department of the District, who shall, within one week, examine the place or building described in the application and report in writing to the Commissioners their opinion as to the propriety of granting the license applied for. The fee for such license shall be $3, which shall be paid to the Collector of Taxes of the District, to be applied to the expense of issuing such license and the inspections provided for by this Article.

SEC. 4. Every such license, when granted, shall begin and end with the fiscal year, and shall contain the name of the person licensed; a statement whether it is for storing or keeping, or both, the said articles or any of them; a description of the place, building or part of building for which the license is granted, and any limitations which the Commissioners may in each case see fit to impose upon the quantity of said articles, or of any of them, which may be stored or kept, or upon the manner of storing or keeping the same.

SEC. 5. A person holding such a license may store or keep said articles, or any of them, according to the terms of his license, either on his own account, or on account of any other person. Every person so licensed shall allow the Fire Marshal of the District, or such other person as may be designated by the Commissioners, to enter the premises described in his license, and to take such samples of said articles, and make such examinations of the said premises as the said Fire Marshal or other person aforesaid may deem expedient.

SEC. 6. No license will be granted for storing or keeping said articles, or any of them, in any part of a building occupied in whole or in part as a dwelling house; or upon any floor of a building above the first floor; or upon such first floor, unless the foundations and walls of the building are of brick, stone or iron, and the sills or walls are built without apertures for a space of at least one foot above such floor; and no license will be granted for storing or keeping crude petroleum, naphtha or gasoline in any part of a building above the cellar, unless said articles are contained in metallic vessels securely closed:

SEC. 7. No license will be granted for selling or keeping for sale at retail, for illuminating purposes, kerosene, refined petroleum or any product of petroleum which has not been inspected by the Chemist of the District, as provided in section one of this Article.

SEC. 8. Whoever, without a proper license therefor, as hereinbefore provided, shall store or keep any of the articles aforesaid, shall forfeit and pay a penalty of not less than $10, nor more than $100; and a violation of any of the terms of any license issued under this Article shall work a revocation of the same, and the Commissioners may at any time revoke any such license for other cause.

Notes from the West.

By RETORT.

JULY 8, 1887.

Steps have been taken anent the recently formed Chicago Gas Trust that will, in all probability, be finally settled by the Supreme Court, the agitators taking the ground that the charters of the more recently organized companies (the Consumers and the Equitable) contained provisos regarding the price at which gas was to be sold, and in definition of conditions which prohibited consolidation with companies already in existence or thereafter to exist. It is further asserted that such a combination of the nature of the present one "is contrary to public policy;" hence it is proposed to make the inquiry whether or not all the Chicago Gas Companies have forfeited their franchises by entering into the existing "combine." The objects of the Gas Trust, as set forth in its articles of incorporation, are as follows:

"The object for which it is formed is to build, erect, purchase, lease, maintain, enlarge, extend, and operate or demise works in the city of Chicago, in the county of Cook, and State of Illinois, and in such other place or places in said State of Illinois as said corporation may by the vote of the majority of the stockholders elect, for the manufacture, supply, sale, and distribution of gas and electricity, or either, for the furnishing of light, heat, fuel, and power for any and all purposes for which gas or electricity may now or hereafter be used; and to purchase and hold or sell the capital stock, or purchase or lease or operate the property, plant, good-will, rights, and franchises of any gas works or gas company or compounds, or of any electric company or electric companies in said city of Chicago, Cook county, Illinois, or elsewhere in said State of Illinois, as said corporation may by vote of a majority of its stockholders elect; and to purchase, hold, sell, operate, or anywise become interested in coal or other properties productive of material necessary or useful in the supply or manufacture of gas or other agency or medium of light, heat, power, or fuel, and to sell, improve, enlarge, extend, maintain, operate, or demise any and all property so purchased or leased."

The capital stock is $25,000,000, divided into $100 shares. Following is the way in which the shares were subscribed for:

Name.	Shares.	Amount.
C. G. Matthews	140,000	$14,000,000
W. L. Elkins	1	100
P. A. B. Widener	1	100
C. T. Yerkes	1	100
W. W. Gibbs	1	100
C. R. Cummings	1	100
A. M. Billings	1	100
H. Fitzhugh	1	100
E. C. Benedict	1	100
S. A. Kent	1	100
P. A. McEwan	50,000	5,000,000
James Marsh	50,000	5,000,000
J. H. Winslow	9,991	999,100

The Chicago *Tribune*, of a recent date, says:

Messrs. McEwan and Marsh are probably representatives of Messrs. Kent and Cummings, and Mr. Matthews of Elkins and Widener, the Philadelphians. The directors elected at the first meeting were: Sidney A. Kent, Columbus R. Cummings, Charles T. Yerkes, A. A. Carpenter, C. L. Hutchinson, E. C. Benedict, Thos. Dolan, A. M. Billings, of the West Side Company, Peter A. B. Widener, William S. Elkins, William S. Reyburn, of the Consumers, Henry Fitzhugh, of the Equitable, and W. W. Gibbs. Probably nearly half of the stock of the Gas Trust is now in the market, selling at about 60 cents. Doubtless the majority will be held by the Philadelphians and their Chicago associates.

The first step toward combining the Chicago Companies was taken before the organization of the Gas Trust, when a majority of the stock of the South Side Company was bought by the Philadelphia syndicate, which later on sold its holdings to the Gas Trust. The Consumers went into bankruptcy, and was bought at court sale by Kent and Cummings, who subsequently sold to the Gas Trust. Then certain parties bought the whole or a majority of the stock and bonds of the Equitable, which, by the way, has yet furnished no gas, and disposed of that to the Gas Trust. That carried with it a large interest in the West Side Gas Company, but not a controlling one. Still later the additional stock needed to make a majority was secured, and along with it the control of the other West Side gas works on Division street. A majority of the stocks and bonds of the Hyde Park and Lake Companies were bought by Cummings and Kent, and then sold by them to the Gas Trust. That made a clean sweep of it. It will be seen that a majority of the Board of Directors of the Gas Trust can do about what they please in fixing the price of gas in Chicago and its vicinity, although technically not a single company has sold out to them or is seemingly controlled by them.

The charters of the two old companies and the city ordinances concerning them are silent on the subject of consolidation and combination. The ordinance which gave the Consumers Company power to operate works and lay mains in this city provides, however—

"And that such company or corporation will not sell, lease, or transfer its franchises and privileges to any other gas company, and shall and will not enter any combination with any other gas company concerning the rate (or price) to be charged for gas, and to pay all damages which the city of Chicago or any consumer of the gas furnished by such company or corporation shall suffer by reason of the failure of such company or corporation to perform any of the obligations or conditions of this ordinance."

A failure to live up to these conditions entails a forfeiture of the franchises. The company gave a $500,000 bond that it would observe all these conditions, the bondsmen being the Consumers' Gas, Fuel and Light Company, of Chicago, as principal, and James W. Brockway, Richard S. Tuthill, Jesse S. Hildrup, Harvey T. Weeks, C. B. Farwell and Geo. H. Harlow as sureties. The Equitable ordinance has the same provision regarding combinations, but it is forbidden to sell out only to companies then existing—it is not forbidden to sell out to any company which might subsequently come into existence, like the Gas Trust.

Since it went into the hands of the Gas Trust the Chicago Gas Light Company has advanced its price 25 cents a thousand, the other companies have made no change. The Consumers' can by its ordinance charge up to $1.75, and the West Side Company can go to $2.50. There is no maximum price fixed for the Chicago Gas Light Company, and it can charge what it pleases. The gas men, therefore, will say that there has been no combination, for there is no uniformity of rates, and no company is now charging what the law allows it to; and that there has been no consolidation, because no corporation by its corporate act has sold or leased its property and franchises; that nothing forbids a stockholder in one gas company selling his stock to another gas company, an individual act not being a corporate one.

The questions, however, which will ultimately have to be decided are:

Whether a company can charge more than a reasonable price, even though the price demanded be less than the maximum fixed in its charter.

Whether it is not contrary to public policy to allow of the consolidation of gas companies when brought about by the act of the corporation or stockholders.

Whether that clause in the articles of incorporation of the Gas Trust allowing it to buy up franchises of other gas companies is not contrary to public policy, and therefore void.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Adding to the Kerr Murray Company's List.—We have been attempting to keep track of Bro. Cressler's movements, and thought we had succeeded fairly well; but the fact is he seems to have outjumped us. However, we herewith submit a list of the work that he has recently agreed to supply from the shops of the Kerr Murray Manufacturing Company, Fort Wayne, Ind.: A telescopic gasholder, 60 feet in diameter, with 14 feet lifts, to the order of the Wichita (Kas.) Gas and Electric Light Company. Single lift holders under contract include the following: El Paso (Texas) Gas, Coal and Coke Company, 60 feet diameter by 18 feet in depth; Pine Bluff (Ark.) Gas and Electric Light Company, 40 feet in diameter by 16 feet in depth; Fuel Gas and Electric Engineering Company, Pittsburgh, Pa., 60 feet in diameter by 18 feet in depth; Stillwater (Minn.) Gas Light Company, 60 feet in diameter by 18 feet in depth; Lexington (Mo.) Gas Light Company, 40 feet in diameter by 16 feet in depth; Dakota Gas and Fuel Company, Grand Forks, Dakota Ter., 33 feet in diameter by 14 feet in depth. The following benchwork is to be distributed as follows: Benches of fives for the gas plants at Huntsville, Ala., New Albany, Ind., and Sedalia, Mo., and a bench of threes for Shreveport, La. We may conclude the list by saying that self-sealing mouthpieces, and general work for benches of sixes, are to be put up in the Memphis (Tenn.) plant. We hope, for Cressler's sake, that it is cooler out his way than is the case (at the present writing) in New York city.

After the Lighting.—We understand that Penn Yan, N. Y., wants to be lighted by electricity, and that at least two electric companies are competing for the right to appease the demands of the residents—and Penn Yan is quite a small place.

Public Lighting in Oakland, Cal.—We are indebted to a correspondent for the following: "Oakland pays out about $30,000, on an average, for lighting its streets. In former years the Oakland Gas, Light and Heat Company has had no competition, but this year more than usual interest attaches to the letting of the contract, because the Pacific Coast Electrical Construction Company, and the Jenney Electric Light Company stated that they would endeavor to secure either a portion or all of the service. A special meeting of the City Council was held last night (Thursday, June 23) for the purpose of opening and reading the bids, and the following propositions were discussed: The Jenney Electric Light Company offered to furnish 175 lamps (2,000-candle power), to be mounted on masts, the latter to be either 100 or 125 feet in height, as desired by the authorities. The price named, per year per light, was $163, the Company to maintain two lamps at the City Hall at its own expense. The bid was made on the basis of a two-year contract. The Pacific Coast Electrical Construction Company offered to erect 160 lamps (2,000 candle power) on 125 feet masts, in consideration of a payment by the city of $141 per year per light, or it would furnish any number of lights (to be located in accordance with mandate of Council) not less than 100, and up to 160, at $155 per lamp per year, the contract to last for two years. One remarkable feature of the last bid—the feature is put forward as a reason why a contract should be granted—is the stress placed on the fact that the Company has invested a sum of money in a plot of land in the city, and has erected thereon a large and substantial building, furnished with a complete electric plant, including a 200-horse power steam provision. This plaint leads some of us to say, if such argument is to influence the authorities in their ultimate granting of a contract for the carrying on of the public lighting, that the Oakland Gas Company has been located here for some years, and originally took some pretty 'tall chances' in respect of the future growth of the Queen City of Alameda county. But, to finish my enumeration of the lighting propositions. The Oakland Gas, Light and Heat Company presented two bids—one to light the city with gas, and the other to do the work by electricity. Under the first it offered to maintain the present 872 gas lamps at the rate of 10½ cents per lamp per night. The bid for electric lighting assumed that in order to adequately light the city 350 arc lamps (2,000-candle power), on 75-foot masts. would be required, or 300 lamps in case 125-foot masts were used. The lights were to be maintained by the Company in consideration of a receipt of 60 cents per light, if a moon-table were followed, that sum to be increased to 80 cents in case the lamps were to be kept alight all night and every night in the year. I should have said that the electric bids, pure and simple, were based on the moonlight table. The bids were referred to the Street Light Committee of Council. Of course, it must seem somewhat hazardous were I to anticipate the action of the authorities in the premises; but let me here assume the uncertain (and unprofitable) *role* of a prophet by venturing the assertion that, whether gas or electricity be decided upon, the Oakland Gas Company is likely to be awarded the work. I think so simply because it is a corporation that stands well in the esteem of the people of our city, a position secured through its willingness to act fairly and equitably to those whom it serves. I will take pleasure in forwarding you information as to the final action of the authorities."

New Gas Works.—At a meeting of the City Council of Griffin, Ga.—held June 29—it was decided to authorize the construction of both gas and water works plant. It is presumed that these projects will absorb $85,000, the scheme being to guarantee the constructors the right to supply the city with 80 public gas lamps, and 45 public hydrants. Griffin is the capital seat of Spalding county, Ga., and is on the old Georgia Central Railroad, where the latter joins the Savannah, Griffin and North Alabama Railroad. It is 43 miles south of Atlanta, and 60 miles west-northwest of Macon. It is a flourishing place, and has made much progress within the past five years. The population of Griffin must be close on to 5,000.

Changes at Westerly, R. I.—At a recent meeting of the Board of Directors of the Westerly Gas Light Company the resignation of Mr. Jno. Loveland was read with regret and accepted with reluctance. Mr. Frank W. Taylor, who has been acting as master mechanic at the Carmichael mills, was appointed to succeed the retiring Superintendent who gave up the post of duty on Saturday last. Mr. Loveland has been Superintendent of the Westerly gas plant since the inception of the Company, in 1868. He was very generally esteemed. We wish Mr. Taylor all possible success in his management of the Westerly works.

The Duluth (Iowa) Plant Extensions.—Some time ago we noted that the owners of the Duluth Gas and Water Company were about to make extensive plant alterations, and we are now in position to say that the betterments include the placing of extra large generators, and the placing of about 7 miles of gas mains, ranging between the extreme diameters of 4 and 10 inches. The water main system is to be extended a like number of miles, pipe diameters ranging between 6 and 20 inches. The pumping capacity of the plant is to be increased by the addition of a Worthington pump rated to a daily duty of 5 millions gallons. Mr. Wm. Craig, the General Manager of the Company, is a good one; he is not a bit afraid of work.

A Suit Compromised.—We are informed that, on June 30, an important suit pending between the gas and electric companies of Springfield, Mo., was compromised and dismissed. Although the Gas Company's exclusive franchise does not expire until 1892, last year the City Council contracted with the local electric light company for the maintenance of 50 arcs on streets not lighted by gas. When the electricians sought to obtain a payment on account of lighting duty performed, the

Gas Company sued out a writ of injunction restraining the authorities from handing over the money. Under the terms of the compromise the injunction is dissolved, and the electricians are permitted to maintain public lights on streets under which there are no gas mains, but shall remove said lights when the Gas Company puts its pipes in the said streets.

KILLED BY ELECTRICITY.—While attaching the wires of an arc electric light circuit to a ventilating fan motor in the kitchen of Lansing & Sickler's restaurant (No. 124 South Clark street, Chicago, Ills.), A. C. Holland, an electrician, was killed by the current. The accident happened on 1st inst.

MARINETTE (WIS.) TO HAVE GAS.—Responsible parties have applied to the authorities of Marinette for the right to construct a gas works at that place. The applicants are likely to succeed, and in view of a favorable response construction work is to be at once instituted. Marinette is a post village in Marinette township, Oconto county, Wis. It is on Green Bay, at the mouth of the Menominee river, and is about half a mile from Menominee, in Michigan. The Chicago and Northwestern Railroad passes through Marinette, which place is noted for its lumber mills.

SUITS FOR INFRINGEMENT.—We are informed that the Siemens-Lungren Company, of Phila., Pa., has brought suit against the U. S. Wenham Gas Lamp Company and the Sheldon Manufacturing Company, both of New York, for infringement of patent rights controlled by plaintiff.

TO BE LIGHTED BY ELECTRICITY.—Last April the City Council of Lafayette, Ind., contracted for the lighting of the city's public streets by electricity, 201 lamps having been determined upon. The intervening time (to June 30) has been taken up in getting the plant ready, and, as all arrangements have been perfected, Lafayette now has a chance to determine whether the new style is better than the old one. We await the verdict.

SUPERFLUOUS ELECTRIC LIGHTS.—The Music Teachers' National Association held their annual session this year at Tomlinson Hall, Indianapolis, Ind., and we are told that the sessions were characterized by concord and an appropriate volume of softened crescendo sound. Of course it is but natural to suppose that harmony would prevail amongst those who follow such a peaceful art, but it is to an echo that followed close upon the adjournment of the Association that we wish to call especial attention. No one will deny that the average daily newspaper man is much given to the manufacture of crescendo sounds when he toots his horn in regard to the virtue of the electric light as compared with the vice of gas light; hence we were hardly prepared for the bland note emitted by the Editor of the Indianapolis *Journal*, who, in commenting on the manner in which Tomlinson Hall was lighted during the gathering of the music teachers, said: "The gas chandeliers at Tomlinson Hall are sufficient to light that place, and do light it fully. The arc electric lights that are there are not only superfluous, but annoying and harmful to the eyesight." Truly, "music hath charms," etc.

CHEAPER GAS FOR PONTIAC, MICH.—We are informed by Mr. W. H. Morgans, Superintendent of the Medbury gas works, of Pontiac, that from and after August 1st the gross price for gas in that city is to be placed at $2.50 per thousand cubic feet; but those who settle their bills, at the Company's office, on or before the 10th day from time of presentation of account are to receive a discount of 50 cents per thousand. Gas at $2 in Pontiac looks like a cheap article, and we expect that Mr. Morgans' liberality will be appreciated by those to whose lighting needs he caters.

NAMED AS GAS INSPECTOR.—Mr. David A. Colton filed his official bond with the City Clerk of Detroit, Mich., on June 30. Mr. Colton is Detroit's gas inspector.

AT GREATER LENGTH.—In our current item columns we note that an application has been made for the right to construct a gas and water plant in Griffin, Ga. We can now add that Col. W. A. Jeter, representing the Brunswick (Ga.) Light and Water Company, was the applicant, and that his proposition to the City Council of Griffin was based on the following premises: The Light and Water Company to erect a gas and water plant at a cost of $85,000, the city to bind itself to maintain 80 street lights and 45 hydrants, and to pay therefor the sum of $4,000 per annum for a term of 25 years; also, to exempt the Company from the payment of taxes and license fees for the first ten years of its life. A second proposal was to the effect that, if the city preferred, the Company would erect the plants for $85,000, and take in payment bonds of the city, to run 30 years and to bear 7 per cent. interest. If the first proposition was accepted the Company was to bear all the expense of maintaining and keeping in order the hydrants and public lamps, including the lighting and extinguishing of the latter. We believe, however, that the city charter of Griffin will have to be altered by State legislation before the proposition submitted by Col. Jeter can be voted on by the inhabitants.

LIGHTED BY ELECTRICITY.—The Thomson-Houston Company's local branch at Augusta, Ga., commenced to supply light on date of June 30. The initial service was voted satisfactory by the residents; but the future will tell the story of its true merit.

PARTING WITH MORE OF ITS GAS STOCK.—Some time ago we noted that the authorities of Atlanta, Ga., had determined to dispose of a certain portion of the stock of the Atlanta Gas Light Company that was held by the city. The proceeds of the sale were to be devoted to equipping and beautifying the track and grounds of the Gentlemen's Driving Park Association, whose managers are largely interested in the yearly fairs held under the auspices of the Piedmont Fair Association. The aforesaid stock sale took place, and if we mistake not a very good average price was obtained for the security. At any rate it brought considerably over par, which must be reckoned as good evidence of the stability of a gas company that has been engaged in a gas war for several years. Having given the Driving Association a chance to put itself in shape, the city now proposes to aid the aims and ends of education, and the money for that object is to be secured in a manner similar to that which enabled the Driving Association to emerge from its conflict with a depleted treasury. The following advertisement, signed by John R. Gramling, Chairman Committee on Finance, explains what the city proposes to do in the matter: "In accordance with a resolution of the Mayor and General Council authorizing the same, and for the purpose of applying the proceeds thereof to the improvement of the female high school, and in constructing a new high school for boys, bids will be received for the purchase of 1,134 shares ($25 par value each) of stock in the Atlanta Gas Light Company, belonging to the city of Atlanta. Bids will be received for the whole or for any number of said shares, up to 2 o'clock P.M. July 18, 1887. Bids to be sealed and addressed to the 'Clerk of Council, Atlanta, Ga.,' and marked 'Proposals for the purchase of gas stock.' The city reserves the right to reject any or all bids." We are sorry that the date selected for closing the bids follows so closely after the date of current issue of the JOURNAL, for no doubt many of our readers would like to bid for the securities which the Atlanta authorities seem to be so anxious to dispose of.

THE SPRINGER GAS APPARATUS.—We are in receipt of the following letter from the National Gas, Light and Fuel Company, of Chicago, Ills. It bears date of 7th inst., and carries its own explanation: "We are pleased to inform you that we have recently closed contracts for sets of Springer gas apparatus as follows: St. Paul (Minn.) Gas Light Company, daily capacity of 500,000 cubic feet; Stillwater (Minn.) Gas Light Company, capacity, 80,000 cubic feet; Sioux Falls (Dak. Ter.), capacity, 80,000 cubic feet. With reference to the first mentioned we would say that we think this the most emphatic indorsement we have ever received, as the St. Paul people had every opportunity to carefully investigate the results obtained at the Minneapolis plant. These were so satisfactory as to induce the St. Paul Company to discontinue its present water gas apparatus and adopt the Springer."

BRO. STEIN SAILS FOR EUROPE.—Brother Stein, of the Siemens-Lungren Company, of Phila., Pa., seems to have been so well pleased with his European trip of last winter that he must needs repeat that experience. At all events he departed from these shores per steamship Trave, on last Wednesday, and we hope that only pleasure awaits him.

MR. HOPPER'S NEW VENTURE.—We are in receipt of a letter from Messrs. T. C. Hopper & Co., No. 2227 Wood street, Phila., Pa., dated July 6, which notes that the orders now in hands of the Company include the following: *Automatic Differential Governors.*—Five 6-inch, three 8-inch, two 10-inch, two 12-inch, and one 20-inch. *Bye-Passes.*—Two 8-inch, and eight 10-inch. *Dry Center-Valve.*—One 10-inch. That looks like business.

A TRIBUTE TO THEIR LATE MANAGER'S WORTH.—Some time ago we chronicled the fact that Mr. W. A. Agard was to sever his connection with the Capital City (Des Moines, Iowa) Gas Light Company, and expressed our surprise that he should voluntarily retire from the management of a corporation on whose behalf he had always been so active and energetic. We must confess that we are still in the dark as to the reasons which impelled him to hand in his resignation, but beyond doubt they were based on proper grounds, for Mr. Agard is not likely to act on im-

pulse or without reason. Aside from any conjecture in the above regard, we may say that July 1st having been the last day of his connection with the Capital City Company, his employees determined also to make that day the occasion of showing how they regarded him in the light of his years amongst them. At noon, of July 1, the employees (fully 75 in number) gathered in a group at the works, and one of their number was delegated to invite Mr. Agard to bid formal good-by to his former co-workers. Having reached the group, and before a word could be spoken, Mr. J. S. McCormick addressed Mr. Agard thus: "My dear sir—Delegated by my associates for this pleasant duty, I present you with this address. In it we strive to commemorate your services to the Company and kindness to us, and to indicate the gratitude I cannot express for what you have done for us during the long time we have been together. Mr. Agard, I feel that the language of compliment is in this case superfluous. Were this an occasion of rejoicing, many things I might then say to testify, not alone my sentiments, but to voice as well the esteem of those you see around you, who so long have faithfully served you because it was a pleasure to do so; but this is rather a time of sorrow, of regret, and I can only say that wherever you go, whatsoever friends you may make (and may their name be legion) you will find none more anxious for your happiness, more earnest for your welfare, more desirous that all good things may be given you, than we are, your old associates and friends, who are here assembled to bid you farewell." In concluding his remarks the speaker presented Mr. Agard with the following address, which bore the signatures of his former associates: "Address to W. A. Agard, of the Capital City Gas Light Company (upon the occasion of his resigning his position of manager), by his employees: Dear Sir—With feelings of sincere regret we have learned that you are about to sever your connection with the Company, and that the relations which heretofore existed between us are about to be terminated. We are desirous of perpetuating the evidences of our esteem and affection, and of our good wishes for your future welfare. During the past ten years we have been associated together under your management, and we are gratified to be able to say that no dissensions such as too frequently disorganize business interests, and disturb the relations between employer and employed, have ever interrupted the harmony which has contributed so largely to the prosperity of the Company. Strikes and suspensions, lockouts and disturbances have never occurred among us. Your kindness and forbearance have never failed us, and we have striven to repay with faithful service the obligations to you, by which we are bound in gratitude and esteem. To the solution of the vexed problems of labor and capital you brought sympathy, kindness and justice, and the happy results thus achieved we may well wish could be attained by others. In the new fields of usefulness to which you go, you may feel assured our gratitude, esteem and affection follow you, and that fortune may be as kind to you as you have been to us is our most earnest wish and heartfelt desire." Now, we submit that the above is convincing testimony as to the manner of man that Brother Agard is, and to show that not only his employees but also the people of Des Moines hold like views in regard to him, we extract the following comments (published in the Iowa *State Register*, July 2) made by a local newsman in respect of the sentiments contained in the address as given above: "A more sincere and deserved tribute was never paid a man by those who had occasion to know him in every aspect of life, and it could not but be pleasing to the gentleman who had so thoroughly won it. During the ten years of Mr. Agard's life in this city he has steadily won his way in the respect and esteem of those with whom he came in contact, and his loss will be deeply felt in the community." Mr. Agard, we understand, will pass the remainder of this summer in Tolland, Conn., where he expects to enjoy the pleasures of a well-earned vacation. In the meantime, we are pleased to say, Mr. E. G. Pratt, who succeeded Mr. Agard at Des Moines, is meeting with the true measure of success that real merit deserves.

No Opposition Charter for Dubuque, Iowa.—Not long ago we called attention to a proposition made to Council by certain Dubuque parties who claimed to represent large holders of Eastern capital, under which the agitators sought to obtain a charter to operate a gas works in opposition to the old Key City Gas Company, of Dubuque, Of course, the threadbare banner bearing the promise of relief to the citizens from the oppression of an arrogant monopoly was unfurled; but somehow or another that ancient rag with its unhallowed inscription fails to flaunt as airily now as it did when the shoddy of its pledges had not been detected by means of the test of promises unfulfilled. Well, the Dubuque opposition flag flaunts no longer over Bro. Howard's devoted head, for the City Council (on date of June 30), in Committee of the Whole, declared, "That it is inexpedient to grant a charter to a new gas Company at this time, and that said application for a charter be rejected." Of course, it is quite an easy matter for City Councils to break their faith with corporations, and we have had plenty of examples in proof of the ease with which such pledges are cast aside; but the Dubuque case happily affords an instance where the Council determined to live up to its word—although at one time it seemed as if the "word" was valueless. The city of Dubuque, on March 13, 1884, entered into a contract with the Key City Gas Company under the terms of which the latter was to be granted entire possession of the lighting field (for a period of 10 years, from July 1, 1884), provided that during the first five years of the agreement the Company supplied gas to the city at $2 per thousand, and to the public at $2.50. During the last 5 years of the contract the city was to be supplied at $1.50 per M., and the public at $2.25. No one claimed or averred that the Key City Company had violated the agreement, nevertheless the speculators, depending on certain influences that could be brought to bear in the proper direction, boldly asked that Dubuque should violate the civic end of the bargain; and that is the true extent of their modest(?) demand. However, since they were foiled, perhaps we might better turn aside from them, and place before our readers the action taken by the Key City gas men on the day following the final action of the Council. This will be understood on a perusal of the following resolution, passed by the Company's Directors on July 1: "*Whereas*, this Company wishes to show its appreciation of desire of Council to maintain in good faith the existing contract between the city and the Gas Company, it is resolved that this Company will now voluntarily so far modify the terms of said contract with the city as to charge for the remaining portion of the first period mentioned in said contract the reduced rates agreed upon for the second term; and from and after the first of July, 1887, will charge the city of Dubuque for gas at the rate of $1.50 per thousand cubic feet, private consumers to be charged at the rate of $2.25 per thousand." Messrs. Bell, Rider and Howard were evidently equal to the occasion, and know how to be generous in the hour of victory.

Purchased.—Messrs. A. N. Bradley and R. C. Pyrne, acting on behalf of the Municipal Gas Company, of Albany, N. Y., are said to have acquired the property of the West Troy Gas Company, paying therefor at the rate of 108.

Cheaper Gas for Gloucester, Mass.—Brother Coffin, of the Gloucester Gas Light Company, is fishing after the local public purse again, for he informs us that, beginning with 1st. inst., the gross price for gas consumed has been placed at $2 per thousand. A discount of 10 per cent. is granted when bills are paid on or before the 15th of the month in which they are presented. The gas stove business is flourishing in Gloucester, and we submit that $1.80 is a low price for gas in a city where at least 25 per cent. of the work done on main excavation must be carried on in solid rock. We notice that Brother Coffin, in his circular announcing the reduction, threatens to come down again, if the people will only help him.

New Plant.—We are informed that the Washington (D. C.) Gas Light Company's plant is to be duplicated in the near future. The works will be constructed on land owned by the Company, just east of the Navy Yard, between M and N streets, and 12th and 13th streets, southeast.

Bro. Harbison Goes to Europe—by Proxy.—The General Manager of the Hartford (Conn.) Gas Light Company, having placed a large portion of his earthly hopes in line with a desire to sell gas at a dollar a thousand, is now busily engaged in reconstructing the Hartford plant in order that a broad road to the dollar-way may be opened up. Thus hampered, of course he could not conscientiously pack his traps and hie him off to Europe; but Harbison, being fertile in expedient, devised a way out the dilemma, and the result is that his daughter, Miss Mamie L. F. Harbison, in company with the Reverend Dr. Parker and his daughter, Miss Lily Pond Parker, sailed for Europe, per steamship Hammonia, from this port on Thursday, July 7.

And Yet Another.—Mr. Eugene Vanderpool, President of the Newark (N. J.) Gas Light Company, accompanied by his family, sail for Europe, per steamship Saale, on the 20th inst.

A Superintendent for Springfield, Mass.—We understand that the Springfield Gas Light Company is to engage Mr. E. P. Holly (son of Mr. Birdsell Holly of water-works fame) as Superintendent, This will be a decided relief to Treasurer Hallet, who has been carrying too heavy a load on his shoulders.

To Purchase the Plant.—The city authorities of Alameda (Cal.) have decided to purchase the local electric lighting plant.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
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SATURDAY, JULY 16, 1887.

Kokomo (Ind.) and Her Gas Well.

The Kokomo (Ind.) *Dispatch*, of June 30, thus dilates on the gas well now known to fame as the "Great Five":

Two hours after the *Dispatch* was on the streets last Thursday, and while the public was yet scanning its modest account of the great gas find on the Sharader farm, 1½ miles southeast of the city, a second report came in.

The great drill, weighing upward of 2,200 pounds, with 900 feet of 2-inch cable at its back, that was powerless against the mighty flow of gas the night before, had been extra weighted and driven three feet further in the sand.

The result was marvelous.

What was before the best gas well in Indiana is to-day the equal, if not the superior, of any in America.

Kokomo rests at last. She will have nothing but the best. She has it. She is satisfied.

We had good wells before. They were above the average. But the Great Five is to them as Hyperion to the Pleiads.

Its magnitude is universally acknowledged. Of one accord, all who see it pronounce it King.

* * * * *

Only during the bustle and noise of the busy hours is the constant roar of the freed monster unheard, even in the heart of the city. About the quieter suburbs its hoarse voice is never silent. Alighting from the night trains at the upper railway stations, the first thing that greets the visitor's ear after the din of puffing engines is hushed is a steady, rumbling sound, like the near approach of a heavily ladened train of cars. So complete is the illusion that he instinctively turns and glances down the track, expecting to see the flashing headlight of the coming locomotive. Instead, he beholds far away on the dark southern horizon a bright reflection, steady and undiminishing as the boreal lights, for which, indeed, but for the season and its southerly location, it might be mistaken. He is quite three miles away from the Great Five, and it is said that twelve miles further to the northward the effect is not materially changed.

Mounting a hack, he is driven southward through the city, crossing the river by the Union street bridge. The reflection on the heavens gathers and spreads, mounting upward and upward like the burning of a hundred hayricks against an autumn sky. The sullen roar has increased to the loud, hoarse moan of an approaching hurricane sweeping through a distant forrest. The rattling of the lumbering hack over the stones is no longer heard, and the passenger makes a trumpet of his hand to address the driver, as one on ship-board in a storm.

The summit of a hill is reached. Through the entwined boughs of trees a seething lake of fire is seen, while great tongues of flame leap skyward, seeming to lick the overhanging clouds. The noise now is like that of a mountain cataract, rushing with the volume of a Niagara. No one attempts to speak; that would be useless. A turn in the road to the east opens a panorama of sharp contrasts. To the right miles of fields, the golden color of their garnered grain heightened in the unnatural light; red-roofed barns, vine-clad cottages, great white farm houses; the frightened cattle, unaccustomed to the new intrusion on their sleeping hours, huddled together in dumb fear. To the left the roaring, blazing, quaking disturber of this pastoral quiet, making the very earth tremble with its unpent might, and paling the harvest moon to an ineffectual star by its dazzling brilliancy.

That's the great Five, the newest wonder, the King of Gas Wells.

* * * * * *

They call it the King.

The roar is heard 18 miles.

People go into the next county to sleep.

The reflection is seen at Frankfort, 28 miles.

Three self-binders were put in the fields on the Sharader farm last night, cutting grain by the light of the Great Five.

The Market for Gas Securities.

The city gas share market has settled down to the slow routine of a decidedly dull summer season. It is true that quotations regularly appear on the tape, and it is also true that these quotations of late have been made on very low figures. In fact the uninitiated might be excused for thinking that Consolidated was on its last legs—or nearly so. The real state of the case, however, is this. The general stock market is in a very unsettled condition, and during these semi-panicky times the speculators pay no attention to the miscellaneous list. At time of writing (noon, July 14), 77 is bid for the stock; but we venture to say that a commission to purchase 500 shares, "at the market," would drive it up to 80. Mark what we say; Consolidated is a purchase at 80 or under. Other city shares are dull and neglected. In Brooklyn a better feeling is exhibited, and we believe that anything on the list, at present figures, offers a chance for a fair profit. The Baltimore see-saw is at work again, Consolidated having advanced about 10 points within the fortnight; but perhaps it might better be let alone. However, we cannot help admitting that it looks tempting. As a rule, it may be written down that dullness reigns supreme.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks,
16 WALL ST., NEW YORK CITY.
JULY 16.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Consolidated	$35,430,000	100	77½	—
Central	440,000	50	30	—
" Scrip	220,000	—	47	57
Equitable	2,000,000	100	120	125
" Bonds	1,000,000	—	113	115
Harlem, Bonds	170,000	—	—	—
Metropolitan, Bonds	658,000	—	110	113
Mutual	3,500,000	100	102	105
" Bonds	1,500,000	1000	101	—
Municipal, Bonds	750,000		—	—
Northern	125,000	50	30	—
" Scrip	108,000			
Yonkers		50	—	80
Richmond Co., S. I.	300,000	50	50	—
" Bonds	12,000	—	—	—
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	107	108
Citizens	1,200,000	20	58	—
" S. F. Bonds	320,000	1000	—	103
Fulton Municipal	3,000,000	100	—	141
" Bonds	300,000		—	106
Peoples	1,000,000	10	62	64
" Bonds (5's)	368,000	—	97	—
" " (6's)	94,000	—	100	—
Metropolitan	1,000,000	100	85	—
Nassau	1,000,000	25	105	—
" Ctfs	700,000	1000	100	—
Williamsburgh	1,000,000	50	—	128
" Bonds	1,000,000	—	111	—
Out of Town Gas Companies.				
Boston (Mass.) Gas Co.	2,500,000	500	193	200
Buffalo Mutual, N. Y.	750,000	100	90	95
" Bonds	200,000	1000	95	100
Citizens, Newark	1,000,000	50	140	145
" " Bonds	45,000	—	—	—
Chicago Gas Trust		100	59	60
Cincinnati G. & C. Co.	6,000,000	100	184	185
Consolidated, Balt.	6,000,000	100	66½	—
" Bonds	3,600,000		107	107½
Chesapeake, Balt.	1,500,000	100	85	—
"	1,000,000		100	102
Consumers Toronto	1,000,000	50	192	—
Central, S. F., Cal.			86	100
Capital, Sacramento, Cal.			56	58
Hartford, Conn.	750,000	25	140	142
Jersey City	750,000	20	168	—
Laclede, St. Louis, Mo.	2,000,000	100	125	—
Louisville, Ky.	2,570,000	50	130	132
Little Falls, N. Y.	50,000	100	95	100
" Bonds	25,000	—	100	103
Montreal, Canada	2,000,000	100	220	221
New Haven, Conn		25	193	197
Oakland, Cal.			37	37½
Peoples, Jersey City		—	25	30
" " Bonds			—	—
Paterson, N. J.		25	90	—
Rochester, N. Y.		50	75	80
Syracuse, N. Y.	350,000	25	—	—
St. Louis, Missouri	600,000	50	—	—
San Francisco Gas Co.				
San Francisco, Cal.	10,000,000	100	60	60½
Memphis (Tenn.) Gas	750,000	100	—	—
" Bonds	240,000	100	103	—
Washington, D. C.	2,000,000	20	210	—
Wilmington, Del.		50	200	208
Havana (Cuba) Gas Co.	3,000,000	100	18	20
" Bonds	550,000		102	—